

**CONTRACT TECHNICAL DOCUMENTS
VOLUME 2 OF 2
216 PATERSON PLANK ROAD
SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2)
CARLSTADT, BERGEN COUNTY, NJ**

Prepared for:

**216 Paterson Plank Road
Cooperating PRP Group**

Prepared by:



PROJECT No. 943-6222



FEBRUARY 2008

Golder Associates Inc.

The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Telephone (973) 645-1922
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www.golder.com



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DISTRIBUTION:

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February 2008

Project No.: 943-6222

CONTRACT TECHNICAL DOCUMENTS

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CONTRACT DOCUMENT ADDENDUM NO. 1

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943-6222

ADDENDUM NO. 1

To: K. Sullivan (Code), T. Raap (ENTACT), M. Cody (ECOR), M. Hadar (RECON),
K. Corradino (Compass)

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 1**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Monday, September 24, 2007

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 1 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

- a) The **Bid Due date** for the subject OU-2 Final Remedy Contract has been **changed from** Wednesday, October 3, 2007 at 5:00 p.m. (EST) **to** Wednesday, October 10, 2007 at 5:00 p.m. (EST).
- b) Replace Section 00020 "Invitation to Bidders", revision 0, in its entirety with the attached revised Section 00020 "Invitation to Bidders", revision 1.
- c) Incorporate answers to selected questions posed by Bidders.

BIDDER QUESTIONS AND ANSWERS

The following are selected questions posed by perspective Bidders, as of September 21, 2007, and responses to these questions are as follows (for continuity purposes questions are numbered and re-printed herein in ***Bold Italics*** with the corresponding response directly following each question):

Q1. Would it be possible to get a PDF copy of the specifications that are not "Protected"?

Response #1: No.

Q2. Would it be possible to get more time on submitting questions?

Response #2: Section 00020 of the Specifications has been revised (see attached) to indicate that Contract Document questions may be submitted up to Friday, September 28, 2007 at 5:00 p.m. (EST), and responses to all outstanding questions will be issued, via addenda to the Contract documents, no later than Wednesday, October 3, 2007.

Q3. Is an extension of the bid due date possible?

Response #3: Yes. See above, and attached for the modified Section 00020 of the Specifications, which presents revised procurement and Contract schedule milestones.

Q4. The FTP Site referenced in your 09-05-2007 e-mail Invitation to bid is no longer available... Can you open up the site again?

Response #4: No.

Please note, the above questions do not represent all questions received to date, and questions not answered herein will be responded to under separate, subsequent Addenda to the Contract Documents. If anyone has any questions or requires additional information, please feel free to contact the undersigned at (973) 645-1922 (ext. 31303).

PREPARED BY:



Mark F. McNeilly, P.E.
Practice Leader and Associate

SECTION 00020

INVITATION TO BIDDERS

The 216 Paterson Plank Road Cooperating PRP Group (hereinafter referred to as the "GROUP"), hereby requests written response to this Request for Proposal (RFP) for the following:

Project Title: 216 Paterson Plank Road Superfund Site
Operable Unit No. 2 (OU-2) Final Remedy

GROUP: 216 Paterson Plank Road Cooperating PRP Group

Location: 216 Paterson Plank Road
Borough of Carlstadt, Bergen County, New Jersey

Summary of Work: See Section 01010 of the Specifications

Schedule:

| | |
|--|--------------------|
| Issue Request for Proposals (RFP)..... | September 5, 2007 |
| Pre-Bid Meeting and Site Visit | September 12, 2007 |
| Bid Questions Due | September 28, 2007 |
| Issue Responses to Questions | October 3, 2007 |
| Bids Due | October 10, 2007 |
| Notice of Award** | October 24, 2007 |
| Contractor Mobilization** | February 18, 2008 |
| Complete Construction** | November 20, 2008 |

** (Note: The above schedule dates are tentative, and subject to change/modification and CONTRACTOR's accepted Baseline Construction Progress Schedule.)

Bidding

Documents:

The Bidding Documents consist of the following:

- a) Contract Drawings;
- b) Specifications and Technical Specifications;
- c) Supplemental Reference Documents, consisting of:
 - Construction Quality Assurance Plan (CQAP) for the OU-2 Final Remedy;
 - Record of decision (ROD), issued by USEPA, dated August 12, 2002, for the OU-2 Final Remedy; and
 - Kiber Environmental Services, Inc. "216 Paterson Plank Road Site – Treatability Study – Final Report", dated July 2000.

See Section 00200 of the Specifications for a listing of additional information available to BIDDERS, which may be viewed at the offices of the REMEDIAL DESIGNER or designated public repositories, if applicable.

Sealed Bids, in accordance with the Contract Documents, will be received until 5:00 PM (EST) on October 10, 2007, and Bids and all communications relative to this RFP shall be directed to:

216 Paterson Plank Road Cooperating PRP Group
c/o Golder Associates Inc.
Attn: Mr. Mark F. McNeilly, P.E.
The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey, 07102.
Phone: (973) 645-1922
Fax: (973) 645-1588
Email: mark_mcneilly@golder.com

The envelopes in which the Bids are submitted shall be sealed and labeled "Bid for 216 Paterson Plank Road Superfund Site – Operable Unit No. 2 (OU-2) Final Remedy". Bids received after the time and date set forth above may be rejected, at the GROUP's discretion, and the GROUP will not be responsible for any delays caused by the United States Postal Service, Federal Express, UPS, or other delivery services/vehicles.

All requisite information, as specified in the Contract Documents, shall be supplied, as a complete Bid Proposal, for evaluation by the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER. All Bids shall remain open for forty-five (45) days following the Bid due date, and all Bid prices shall be guaranteed, by each BIDDER, over this entire evaluation period.

Furthermore, the GROUP tentatively intends to select a successful BIDDER, and issue a Notice of Award (NOA) on or around October 24, 2007. Following issuance of the NOA, the GROUP intends to conclude Contract negotiations and issue a Notice to Proceed (NTP), which shall include the stipulated commencement date for the Work, on or before November 14, 2007.

There will be a mandatory Pre-Bid Meeting and Site Visit for all BIDDERS on September 12, 2007 at 11:00 AM (EST). This meeting will be held at the Site, and will convene inside the entrance gate located at 216 Paterson Plank Road in the Borough of Carlstadt, Bergen County, New Jersey. Up to three (3) representatives (max.) from each Bidder may participate in this Pre-Bid Meeting. If any BIDDER requires directions to the Site, please contact the above noted project contact.

Each Bidder is required to attend this Pre-Bid Meeting and Site Visit to become familiar with local conditions, facilities, construction, and labor, so that potential difficulties and restrictions that might arise during execution of the Work under this Agreement are fully understood. Bids from BIDDERS who have not attended this Pre-Bid Meeting will not be accepted.

This letter and bidding documents are considered confidential, and are provided only as Bidding Documents for the procurement of remedial construction services. If any BIDDER chooses not to submit a Bid, please provide written notification, to the above noted project contact, of your intent not to submit a Bid. In addition, all bidding documents shall be returned within seven (7) days of any "no bid" notification.

August, 2007
943-6222

216 Paterson Plank Road Site
OU 2 – Technical Specifications
Invitation to Bidders – 00020
page 3 of 3

Revision 1

Bids will be opened privately on or after the Bid due date. The GROUP reserves the right, at its discretion, to reject any and all proposals and/or to waive any informality in any Bid or the bidding process. Bidding will be by invitation only, at the GROUP's discretion.

The GROUP may conduct such investigations, as it deems necessary, to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of any BIDDER, SUBCONTRACTOR, or vendor. Each BIDDER shall furnish the GROUP with all such information, as may be requested, for this purpose.

Requests by BIDDERS for explanation, interpretation, and/or clarification of the Contract Drawings, Specifications, and/or other Contract Documents shall be submitted, in writing, to the above noted project contact. No response will be made to any inquiries received later than the close of business (i.e., 5:00 PM) on September 28, 2007, and the person(s) submitting said requests shall be responsible for their timely delivery.

Interpretations and/or explanations of the Contract Documents will only be made in writing, and copies of which will be mailed, emailed, or delivered via facsimile to all listed holders of the Bidding Documents by October 3, 2007. At the BIDDER's request, interpretations may be transmitted electronically (via facsimile or e-mail).

The GROUP will not be bound by any explanations, clarifications, or interpretations conveyed to the BIDDERS that are not incorporated into the Contract Documents by Addenda.

***** END OF SECTION *****

CONTRACT DOCUMENT ADDENDUM NO. 2

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943-6222

ADDENDUM NO. 2

To: K. Sullivan (Code), T. Raap (ENTACT), M. Cody (ECOR), M. Hadar (RECON),
K. Corradino (Compass)

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 2**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Wednesday, September 26, 2007

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 2 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

- a) The **Bid Due date** of Wednesday, October 10, 2007 at 5:00 p.m. (EST) **remains unchanged**.
- b) Replace Section 02460 "Steel Sheet Piling", revision 0, in its entirety with the attached revised Section 02460 "Steel Sheet Piling", revision 1.
- c) Replace Section 01025 "Measurement and Payment", revision 0, in its entirety with the attached revised Section 01025 "Measurement and Payment", revision 1.
- d) Incorporate answers to questions raised by the prospective Bidders.

BIDDER QUESTIONS AND ANSWERS

The following are questions raised by the prospective Bidders, as of September 26, 2007, and responses to these questions are as follows (for continuity purposes questions are numbered and re-printed herein in ***Bold Italics*** with the corresponding response directly following each question):

- Q5. "If possible, could you please send us (the bidders) electronic Word documents for all the bid forms we are required to fill out for ease of direct entry of our responses?"***

Response #5: The electronic Word file for the entire Specification Section 00300 will not be provided. However, an electronic Word file for Specification Section 00300, pages 5 through 15 of 15, will be provided under separate electronic mail.

- Q6.** *“The contract plans define the required steel sheet pile sections as AZ-18, the specifications in paragraph B also reference AZ-18 steel sheet piles. The second sentence of this paragraph states that “These sheet piles shall have a minimum effective Section Modulus (S_{xx}) and Moment of Inertia (I_{xx}) values of 48.3 in³/ft and 406.5 in⁴/foot respectively.” These values are those of a AZ-26. Please clarify.”*

Response #6: The specified new steel sheet pile wall shall be comprised of AZ-18 sheet pile section. See attached revised Specification Section 02460.

- Q7.** *“Can the AZ-18 be replaced with an alternate sheet?”*

Response #7: Yes, provided the Section Modulus (S_{xx}) and Moment of Inertia (I_{xx}) of the alternate sheet pile section are equal to or exceed the specified design values. See attached revised Specification Section 02460.

- Q8.** *“Is the existing membrane that is to be removed and disposed of classified as hazardous?”*

Response #8: Based on the Operable Unit No. 1 (OU-1) Interim Remedy design and construction “as built” documents, the existing geomembrane consists of a 60-mil High Density Polyethylene (HDPE) geomembrane placed atop a 120-mil, non-woven geotextile fabric cushioning layer.

It appears this geomembrane and cushioning layer were placed atop prepared subgrade surfaces consisting of Soil soils and “spoils from the slurry wall trench”, which were regraded and proof rolled prior to installation of the geotextile cushioning and geomembrane materials.

Given the existing geomembrane and geotextile cushioning materials are in direct contact with Site soils, Bidders shall assume these existing geomembrane and geotextile materials are to be disposed of off-Site, and said materials may be characterized as “Contaminated, Non-Hazardous” materials.

Furthermore, Bidders are hereby notified that Bid Item No. 8, “Remove Existing Geomembrane and Subgrade Preparation”, shall include all removal, testing, characterization, and disposal costs in connection with removal and off-Site disposal of the existing geomembrane and any geotextile cushioning materials underlying the existing geomembrane.

In addition, Bidders are hereby notified that Bid Item No. 8 shall include all costs in connection with draining and removing the existing geomembrane weighting system. See attached revised Specification Section 01025.

Q9. "Bid item 19 "Place Stone Aggregate and Rip Rap" is the quantity 500 CY for each material of 1,000 CY each?"

Response #9: For bidding purposes, Bidders shall assume that the total estimated quantity, as presented in Exhibit "A" to the Bid Forms, for Bid Item No. 19, "Place Stone Aggregate and Rip Rap", includes two-hundred-fifty (250) cubic-yards of stone aggregate and seven-hundred-fifty (75) cubic-yards of rip rap.

Q10. "Please provide a finish schedule for the building?"

Response #10: The design and construction of the specified Pre-Engineered Metal Building, per Section 13120 of the Technical Specifications, has been left to the selected Remedial Contractor. Hence, a project-specific "finish schedule" for the specified Pre-Engineered Metal Building, per Section 13120 of the Technical Specifications, is currently not available.

That said, Golder assumes the selected Remedial Contractor will develop the requisite project-specific "finish schedule" for this structure, which was design in accordance with Contract Documents and all governing local, State, and Federal rules, regulations, laws, and codes.

In addition, Golder presumes that the prospective Bidders will present all appropriate Bid assumptions in connection with the design and construction of the specified Pre-Engineered Metal Building within Exhibit "F" to the Bid Forms.

At a minimum, this structure shall include two (2) means of ingress/egress: 1) a standard hollow, lockable steel door and frame; and 2) an 8-foot-wide (min.) lockable overhead coiling door. If Bidder desires to further define the scope of this structure, it is advised to provide all appropriate design and Bid assumptions in Exhibit "F" to the Bid Forms.

Q11. "To provide the specified electrical requirements for the new building is a new pole required or is the existing service adequate?"

Response #11: The existing electrical service to the Site extends from a utility pole along Paterson Plank Road to a pole and meter on-Site, which is located within the vicinity of the existing above ground storage tank (See Construction Drawing SCP-1).

For bidding purposes, Bidders shall assume that this existing electrical service from the utility pole on Paterson Plank Road to the Site is adequate to meet the electrical needs/demands of the subject OU-2 Final Remedy.

Furthermore, Bidders are hereby notified that all costs associated with relocating and/or connecting this existing electrical service to the specified new pre-engineered metal building shall be included under Bid Item No. 24, "Install Pre-Engineered Metal Building".

In addition, if any Bidder believes a new and/or additional on-Site utility pole(s) is(are) needed to adequately relocate/connect the existing electrical service to the specified pre-engineered

metal building, all costs associated with providing said new and/or additional on-Site utility pole(s) shall be included under Bid Item No. 24, "Install Pre-Engineered Metal Building".

Q12. "Does the building installer have to be OSHA 1910.120 certified?"

Response #12: Given the subject Site is being remediated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), any on-Site construction activities that are related to the remediation of hazardous materials are covered under 29 CFR 1910.120.

Ultimately, the answer to this question will depend on the selected Remedial Contractor's proposed construction procedures, sequences, and schedule.

If the selected Remedial Contractor can demonstrate that selected on-Site operations (e.g., installation of the specified Pre-Engineered Metal Building) do not involve any direct exposure or the reasonable possibility for exposure to safety or health hazards, said operations may not require strict 29 CFR 1910.120 certification.

Furthermore, if the selected Remedial Contractor believes selected construction operations do not have to strictly comply with 29 CFR 1910.120, it must clearly demonstrate, in its project-specific Health and Safety Plan (HASP), how its employees will be protected during said operations.

This project-specific HASP must also define what level of training would be sufficient for workers who will not be exposed above permissible exposure limits, and this plan must indicate that there is no possibility of an emergency developing, as a result of an uncontrolled release of any hazardous substances.

Q13. "What are the MLW and MHW elevations for Berry's Creek?"

Response #13: Based on the National Oceanic and Atmospheric Administration (NOAA), there are no active or historic tidal stations along Berry's and Peach Island Creeks, which have been tied into the North American Vertical Datum of 1988 (NAVD). Hence, precise high/low tide elevations, along Berry's and Peach Island Creeks, are not available for the subject Site.

However, NOAA does indicate that the Mean Tidal Range (i.e., vertical difference between the Mean High and Low Tides) along Berry's Creek is about five-point-four (5.4) feet. In addition, Golder estimates, based on the available information, the Mean High and Low Tides in Berry's are at about elevation El. +2.75 feet and El. -2.65 feet (NAVD88), respectively.

In addition, it should be noted that there exists a tidal gate along Peach Island Creek just North of Gotham Parkway (see Drawing SCP-1), which appears to reduce upstream tidal fluctuations along Peach Island Creek. Hence, tidal fluctuations along Peach Island Creek, directly adjacent to the Site, may be less than those observed within the downstream Berry's Creek.

Q14. *“Please forward copies of the soil borings for B-1, B-14, B-15, B-17, B-18, RD-2, RD-3, RD-4 and RD-5?”*

Response #14: See attached.

Q15. *“Whereas the existing sheet pile wall has failed rotationally will the existing steel sheet piles interfere with the installation of the new sheet piles?”*

Response #15: During the OU-1 Interim Remedy, sections of the existing sheet pile wall moved (i.e., translated and/or rotated) under the applied construction loads, and a series of H-piles were installed in front of the sheet pile wall to further support and stabilize the wall. See attached for copies of relevant portions of the OU-1 “As Built” Drawings.

Overall, it appears the existing sheet pile wall rotated about ten (10) to thirty (30) degrees from vertical over a significant portion of its length, and the OU-1 “As-Built” Drawings indicate the installed sheet piles had lengths of about twelve (12) feet.

For the OU-2 Final Remedy, the proposed new sheet pile wall will be located about five (5) behind the top of the existing sheet pile wall, and based on the available “as built” design information for the existing sheet pile, the new sheet pile wall should not interfere with the existing sheet pile wall.

Q16. *“For bonding purposes is this project considered a superfund site?”*

Response #16: Yes.

Q17. *“Please provide contact and phone number for the transportation company adjacent to the property.”*

Response #17: ABF Freight Systems, Inc.
Attn: **Mr. Donald Bock**
Branch Manager
256 Paterson Plank Road
Carlstadt, New Jersey 07072
Phone: (201) 939-8400
Fax: (201) 939-8967
Email: dbock@abf.com

Q18. *“Please provide waste classifications for waste to be taken off-site.”*

Response #18: All testing, characterization, and disposal costs in connection with removal and off-Site disposal of any potentially contaminated materials shall be included in the designated unit costs identified in Exhibits “A” and “B” to the Bid Forms, as appropriate.

If Bidders are uncertain how to characterize and/or classify any potentially contaminated materials, which have been identified for off-Site disposal, Golder suggests that each Bidder clearly and in detail lists all applicable bidding assumptions in Exhibit "F" to the Bid Forms.

Q19. "Can you please provide a copy of the Soil Boring Logs."

Response #19: See response to Question No. 14. If additional soil boring logs are required, please indicate those specific soil borings required, and they will be provided under separate Addenda to the Contract Documents.

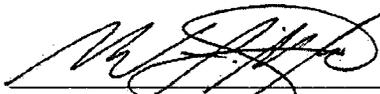
Q20. "Could the list of respondents of the 216 Paterson Plank Road Cooperating PRP Group be provided?"

Response #20: See attached for a copy of the first two (2) pages from the September 30, 2004 Consent Decree, which lists parties that signed said Consent Decree.

Lastly, the Group has indicated its preference to interview selected Bidders, and requests that all prospective Bidders kindly reserve October 18th and 19th in their schedules for these interviews. However, it should be noted that all Bidders will not be required to participate in said interviews. That said, Golder hopes to notify all Bidders to be interviewed no later than October 16th.

If anyone has any questions or requires additional information, please feel free to contact the undersigned at (973) 645-1922 (ext. 31303).

PREPARED BY:



Mark F. McNeilly, P.E.
Practice Leader and Associate

SECTION 02460

STEEL SHEET PILING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. CONTRACTOR shall furnish all labor, equipment, materials, tools, and appurtenances, and perform all operations necessary for installing steel sheet piles, as indicated on the Contract Drawings and as specified herein.
- B. CONTRACTOR shall comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, State, or Federal authorities having jurisdiction. CONTRACTOR is responsible for identifying and obtaining all appropriate licenses, approvals, and permits to complete the work of this Section. CONTRACTOR shall provide a “Competent Person” to implement, supervise, and inspect the Work.
- C. CONTRACTOR shall locate all existing active and abandoned utilities and structures in designated Work areas prior to commencing any steel sheet pile installations. CONTRACTOR shall also protect from damage those utilities and structures which are to remain in place.

1.02 RELATED SECTIONS

- A. 01050 – Field Engineering/Surveying
- B. 01564 – Health and Safety
- C. 02100 – Site Preparation
- D. 02220 – Excavation
- E. 02223 – Backfill and Fill
- F. 02831 – Chain Link Fence and Gates

1.03 REFERENCES

The latest editions of the publications listed below form part of these Technical Specifications:

- A. American Welding Society (AWS):
 - 1. AWS D1.1/D1.1M – Structural Welding Code (Steel).
- B. ASTM International (ASTM):
 - 1. ASTM A328/A328M – Steel Sheet Piling.
 - 2. ASTM A572/A572M – High-Strength, Low-Alloy Columbium-Vanadium Structural Steel.

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3. ASTM A6/A6M – General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
4. ASTM A690/A690M – High-Strength, Low-Alloy Steel H-Piles and Sheet Piling for Use in Marine Environments.
5. ASTM A857/A857M – Steel Sheet Piling, Cold-Formed, Light Gage
6. ASTM A36.A36M – Carbon Structural Steel.

1.04 SUBMITTALS

- A. Sheet Pile Wall Installation Work Plan: Prior to commencement of steel sheet piling installation activities on-Site, CONTRACTOR shall prepare and submit, to the GROUP's REPRESENTATIVE, a detailed, comprehensive steel sheet pile installation work plan, which includes, but not limited to, the following:
 1. CONTRACTOR and/or SUBCONTRACTOR Qualifications;
 2. Methods and sequences of construction;
 3. Material storage and lay-down areas;
 4. Complete descriptions of sheet piling driving equipment, including hammers, extractors, protection caps, and other installation appurtenances;
 5. Proposed methods of extracting, pulling and/or re-driving of installed steel sheet piling;
 6. Manufacturer and/or supplier product data sheets; and
 7. Material certificates.
- B. Shop Drawings: Prior to commencement of steel sheet piling installation activities on-Site, CONTRACTOR shall prepare and submit, to the GROUP's REPRESENTATIVE, detailed drawings for the specified steel sheet piling, including fabricating sections. These drawings shall show complete piling dimensions and details, driving sequences, and locations of installed piling. These drawings shall include details of top protection, special reinforcing tips, tip protection, lagging, splices, fabricated additions to plain piles, cut-off methods, and dimensions of templates and other temporary guide structures for installing piling. Drawings shall provide details of the methods of handling piling to prevent permanent deflection, distortion, or damage to piling interlocks.
- C. Records: CONTRACTOR shall prepare, maintain, and submit, to the GROUP's REPRESENTATIVE, complete records of the completed sheet piling driving operations. These records shall provide a system of identification that shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions, and top and bottom elevations of installed piling.
- D. Manufacturer's Mill Certificates: For each shipment of material, CONTRACTOR shall submit, to the GROUP's REPRESENTATIVE, copies of all Manufacturer certified material test reports, showing that the sheet piling and appurtenant metal materials meet the specified requirements. These mill certificates shall be submitted for each shipment of material, and corresponding

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lot numbers for each shipment shall be clearly noted on said certificates. Material test reports shall meet the requirements of ASTM A6/A6M. Identification data shall include, but not be limited to, piling types, dimensions, chemical compositions, mechanical properties, section properties, heat numbers, and mill identification marks.

- E. Submit in accordance with Section 01300 of these Technical Specifications.

1.05 DELIVERY, HANDLING AND STORAGE

- A. Materials delivered to the Site shall be new and undamaged, and shall be accompanied by the Manufacturer's mill certification reports.
- B. Sheet piling shall be stored and handled in the manner recommended by the Manufacturer to prevent permanent deflection, distortion, or damage to the interlocks. At a minimum, CONTRACTOR shall support all sheet piling on level blocks or racks spaced not more than ten (10) feet apart, and not more than two (2) feet from the ends.
- C. Concentrated loads that occur during stacking or lifting shall be limited to less than those that could produce permanent deformation of the material.
- D. Sheet pile handling devices shall be designed such that damage to protective coatings applied to the steel sheets is prevented.
- E. Storage of steel sheet piling shall be in such a manner to facilitate required inspection activities.

1.06 EQUIPMENT

- A. CONTRACTOR shall submit complete descriptions of the driving equipment, including caps, leads, and guides where required. The description of the hammer proposed for driving piles shall include make and model number.
- B. CONTRACTOR shall select the pile driving method and equipment such that existing buildings and structures, as specified in Sub-Section 1.08 herein, are protected against damage due to vibration and settlement that may be caused by the pile driving operation.
- C. CONTRACTOR shall make such substitutions and modifications, found to be necessary during the progress of the work, as approved by the REMEDIAL DESIGNER.

1.07 DESIGNING AND DETAILING

- A. The locations, arrangements, lengths, and cross sections of steel sheets shall be as shown/indicated on the Contract Drawings.

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- B. CONTRACTOR shall design and detail all corners, wyes, and other special shapes, connections, and appurtenant items necessary to make the sheet pile retaining wall complete.
- C. CONTRACTOR shall submit detail drawings, including design computations, to the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER for approval.

1.08 PROTECTION OF PEOPLE AND PROPERTY

- A. CONTRACTOR shall plan and conduct its operations and take all necessary precautions to prevent damage to existing utilities, structures, roads, grades, slopes, surface water drainage features, underground piping, manholes, monitoring wells, piezometers, and other site features; to safeguard people and property; to minimize traffic inconvenience; to minimize dust and odors; and to provide safe working conditions. CONTRACTOR shall repair, to the GROUP's REPRESENTATIVE's satisfaction, and at no additional expense or delay to the GROUP, any and all damage which occurs as a result of the excavation work.

PART 2 – PRODUCTS

2.01 STEEL SHEET PILING

- A. Steel sheet piles shall be hot-rolled, and conform to ASTM A572/A572M, Grade 50.
- B. Provide and install AZ-18, or approved equivalent, steel sheet pile sections. These sheet piles shall have minimum effective Section Modulus (S_{xx}) and Moment of Inertia (I_{xx}) values of 33.5 in³/foot and 250.4 in⁴/foot, respectively.
- C. All steel sheet piling shall be installed at the locations and to the depths shown on the Contract Drawings.
- D. Sheet piling interlocks shall be free-sliding, provide swing angles suitable for the intended installation, but not less than three (3) angular degrees when interlocked, and maintain continuous interlocking when installed.

2.02 APPURTENANT MATERIALS

- A. Metal plates, shapes, bolts, nuts, rivets, and other appurtenant fabrication and installation materials shall conform to Manufacturer's standards, and to the requirements specified in the respective sheet piling standards.
- B. Structural and miscellaneous steel shall conform to ASTM A36/A36M.

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PART 3 – EXECUTION

3.01 ALIGNMENT AND TOLERANCES

- A. CONTRACTOR shall furnish necessary surveying services for establishing sheet piling locations, in accordance with Section 01050 of these Technical Specifications.
- B. Any sheet piles driven/installed more than three (3) inches from the locations indicated on CONTRACTOR's approved steel sheet piling shop drawings will be rejected.
- C. Sheet piling shall be driven plumb, and shall not deviate from the vertical by more than 1/8-inch-per-foot. If at any time, the sheet piles are found to be out of plumb CONTRACTOR shall immediately take corrective measures to bring the effected sheet piles back into specified tolerances to ensure plumbness of the succeeding piles are not effected.
- D. Prior to undertaking any corrective measures, CONTRACTOR shall submit its proposed methods, to the REMEDIAL DESIGNER for approval, to correct sheet pile sections that are out of alignment or plumbness. All corrective measures shall not compromise the capability of the interlocks.
- E. CONTRACTOR shall provide suitable guide structures to ensure that piles and driving equipment are properly aligned during driving. Guide structures shall be equipped with suitable devices to avoid damaging protective coating of sheet piles, as necessary.
- F. Costs associated with corrective actions and/or removing/re-driving of rejected sections of steel sheet piling shall be at CONTRACTOR's own cost, and not reimbursed by the GROUP.

3.02 DRIVING

- A. Sheet piles shall be driven in sections and sequence as may be indicated on the Contract Drawings and as specified herein.
- B. Prior to driving sheet piles, existing obstructions and utilities shall be located and removed.
- C. No sheet piles shall be driven within fifty (50) feet of newly placed concrete which is less than forty-eight (48) hours old.
- D. All steel sheet piles shall be driven to or below the tip elevations (i.e., toe-of-wall) indicated on the Contract Drawings.
- E. Protective caps shall be used during driving operations, as required by the REMEDIAL DESIGNER, to prevent damage to the top of the sheet piles.

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- F. Sheet piling driven to the required depth and extending above the specified top of wall elevations, as indicated on the Contract Drawings, shall be trimmed off at the top of wall elevation noted on the Contract Drawings. The CONTRACTOR shall trim the tops of all damaged sheet piles, which interfere with the driving activities or detrimentally affect appearance, if exposed in the finished work.
- G. If piles driven to the required depth are too short to reach the required top elevation, said effected sheet piles shall be extended by splicing. CONTRACTOR shall submit its splicing procedures, as necessary and as part of its shop drawing submission.
- H. Each sheet pile shall be interlocked with adjoining sheet piles for its entire length. Where ball and socket interlocks are indicated on the Contract Drawings, piles shall be driven with the ball edge leading. Sheet piles driven out of interlock with adjacent sheet piles shall be removed and replaced with new sheet piles.
- I. If the driving of a sheet pile tends to drag an adjacent sheet pile below grade, it shall be reported to the REMEDIAL DESIGNER, prior to taking any corrective actions. Corrective actions shall be as approved by the REMEDIAL DESIGNER.
- J. Jetting of steel sheet pile section will not be permitted on this project.
- K. Where boulders or other obstructions render it impracticable to drive sheet piles to the required depth, CONTRACTOR shall stop further driving, and submit its procedures to remove the obstructions or propose a re-designed configuration.
- L. CONTRACTOR shall maintain and submit records of driving. Driving records shall include alignment and verticality checks, location of splices and inspection of splice welds, and shall note driving equipment used and locations and depths where difficulty in driving was encountered.
- M. The hammer selected to drive the sheet piles shall be shown to limit the induced stresses in the sheet piles to less than 90% of the yield stress of the pile material.
- N. Each pile section (or pair of sheets) shall not be driven more than five (5) feet ahead of the adjacent sections.
- O. Open socket ends shall be kept free of soil during driving.

3.03 SPLICES

- A. Splices in sheet piling, as approved by the REMEDIAL DESIGNER, shall be full-penetration butt-welded. No more than one (1) splice per sheet will be allowed. When adjacent piles are to be spliced, splices shall be staggered not less than ten (10) feet apart in elevation.

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- B. Splices shall be fabricated to assure alignment of the spliced parts. Change in slope between parts spliced shall not exceed 1/500.
- C. CONTRACTOR shall utilize welding procedure in accordance with AWS D1.1. CONTRACTOR shall provide inspection of welding, and shall submit qualification records of welders and welding procedures.

3.04 SEALING

- A. All handling holes in the sheet pile shall be sealed using steel plate having the same thickness as the sheet pile. Steel plate shall be seal welded all around.
- B. All exposed interlock joints shall be sealed using Volclay Joint Seal as manufactured by American Colloid Company or approved equal. Application of joint seal shall be in accordance with the manufacturer's recommendations.

***** END OF SECTION *****

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 GENERAL

- A. Furnish all labor, materials, tools, equipment, and appurtenances required to measure the quantity of the Work completed by CONTRACTOR, as specified in the Contract Documents.
- B. This Section establishes the payment criteria applicable to those designated portions of the Work performed under stipulated “unit price” and “lump sum” payment methods.
- C. This section also establishes defect assessment and non-payment criteria for any and all rejected Work, in the opinion of the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER, due to CONTRACTOR’s non-compliance with the Contract Documents.
- D. Applications for Payment shall be in accordance with the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 00300 – Bid Forms
- B. Section 00700 – General Conditions
- C. Section 00800 – Supplementary Conditions
- D. Section 01050 – Field Engineering and Surveying
- E. Section 01300 – Submittals
- F. Section 01700 – Contract Closeout
- G. Section 01720 – Record Documents

1.03 AUTHORITY

- A. Measurement methods delineated in this Section are intended to compliment the criteria presented within the individual Sections of the Specifications. In the event of conflict, the requirements of the individual Specification Sections shall govern.
- B. CONTRACTOR shall take all measurements, where required, and compute quantities for each Bid Item included in each Application for Payment. The GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER will verify all items, measurements, and quantities.

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- C. CONTRACTOR shall assist in verifying quantities by providing any and all necessary equipment, workers, and survey personnel, as required and requested by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER.

1.04 UNIT QUANTITIES SPECIFIED

- A. Quantities and measurements indicated in the Bid Forms (i.e., Exhibits "A" and "B" to Section 00300 of these Specifications) are for bidding and Contract purposes only. Actual in-place quantities and measurements supplied by CONTRACTOR and verified by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall determine final payment.
- B. If CONTRACTOR believes the Work will require more or fewer quantities than those quantities indicated in the Bid Forms, it shall provide its estimated quantities to complete the work at the unit sum/prices listed in the Bid Forms.

1.05 MEASUREMENT OF QUANTITIES

- A. Measurement Devices:
 - 1. Weigh Scales: Inspected, tested, and certified by the State of New Jersey Weights and Measures Department within the past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicles.
 - 3. Metering Devices: Inspected, tested, and certified by the State of New Jersey within the past year.
- B. Measurement by Weight: Measurements of quantities expressed in weight units shall be based upon actual measured weights, utilizing measurement devices deemed acceptable and approved by the GROUP's REPRESENTATIVE.
 - 1. Concrete reinforcing steel, rolled, or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weights.
- C. Measurement by Volume: Measurement of quantities expressed in volume units shall be based upon in-place, neat plan line projections of the Work limits, as determined by field survey record drawings, for each item with no additional allowances for shrinkage, swelling, or creep.
 - 1. In computing volumes of excavation and fill, the "average end area" or equivalent methods, deemed acceptable and approved by the GROUP's REPRESENTATIVE, will be used.
- D. Measurement by Area: Measurement of quantities expressed in area units shall be based upon horizontal, planimetric projections of the Work limits, as

determined by field survey record drawings, for each item with no additional allowances for slopes.

- E. Measurement by Horizontal Linear Units: Measurement of quantities expressed in horizontal linear units, such as piping and conduits, shall be based upon field surveyed stations recorded along straight or curved centerline projections for each respective item.
- F. Measurement by Vertical Linear Units: Measurement of quantities expressed in vertical linear units, such as wells, piezometers, etc., shall be based upon field surveyed soundings of the bottoms of each installed borehole, well, or piezometer measured relative to original ground surface for each respective item.
- G. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear units/means or any combination thereof, as appropriate, as a completed item or unit of the Work.

1.06 PAYMENT

- A. Payment for each “lump sum” and “unit price” Bid Items, as stated in the itemized Bid Forms (i.e., Exhibits “A” and “B” to Section 00300 of the Specifications), shall constitute complete, full compensation for all required labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application, or installation of an item of the Work required to complete all work specified under that particular item, including cleanup.
 - 1. The price bid for each “lump sum” and “unit price” stated in the itemized Bid Forms shall be deemed to include allowances for CONTRACTOR’S overhead and profit.
 - 2. Reference to relevant Sections of the Specifications is provided to facilitate pricing. However, CONTRACTOR shall, using its own judgment, determine those Sections of the Specifications that are relevant to each pay item, prior to submitting its comprehensive price to cover all Work identified and specified in the Contract Documents.
 - 3. Each “lump sum” and “unit price” stated in the itemized Bid Forms shall include, except where explicitly stated otherwise, all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent, including, but not limited to, cleaning up, Site security, emissions control, odor control, duct control, decontamination, health and safety, quality control, and traffic control.
 - 4. Payment of all Bid Items stated in the itemized Bid Forms will be made in accordance with the Contract Agreement, and only after verification by the GROUP’S REPRESENTATIVE.
 - 5. Retainage shall be held on all payments, in accordance with the requirements stipulated in the Contract Agreement.

- B. For “in-progress” payments, placement documentation shall include, but is not limited to, daily field reports prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE, delivery invoices, scale house measurements, field measurements utilizing measuring tapes or wheels, etc. Equipment and methods of material-placement documentation for “in-progress” payments shall be deemed acceptable to the GROUP’s REPRESENTATIVE.
- C. Final payment for Work shall be made on the basis of actual measurements and quantities, reviewed, verified, and accepted by the GROUP’s REPRESENTATIVE, multiplied by the unit prices for the Work, as state in the Bid Forms, that is incorporated into, or made necessary by, the Work. For final payment, record documentation shall include, but not be limited to, actual field surveys by Professional Land Surveyors licensed and registered in the State of New Jersey.
- D. Payment will be made to the Contract limits specified in the Contract Documents. If the constructed limits are less than the specified limit, payment will be made to the actual limits of construction, as shown on the Record Drawings. Payment for quantities that exceed the specified Contract limits will only be made with the approval of the GROUP’s REPRESENTATIVE. Payment for quantities that exceed the Contract quantities can only be obtained through approved Change Order(s) before Contract quantities are exceeded.
- E. No partial payments shall be made for the installation of items, which have not been tested and approved. No piping or conduits shall be backfilled prior to completion of all necessary field surveys to document final “as-built” conditions.
- F. Partial payment will be made for materials delivered to the Site (exclusive of fill materials), and adequately stored and protected until installation. Partial payments for delivered materials will only be made for items that CONTRACTOR intends to use within ninety (90) days of delivery, unless otherwise approved by the GROUP’s REPRESENTATIVE. Materials will be paid for at direct cost plus shipping, upon presentation of a valid receipt, bill, or invoice with the payment request. All such requests must have material quantities verified by the GROUP’s REPRESENTATIVE, prior to payment. CONTRACTOR shall protect all delivered materials, as outlined by the manufacturer while being stored at Site, and shall replace all damaged materials at no cost to the GROUP. No partial payment will be made for materials delivered to the Site for which the receipt, bill, or invoice is less than five-hundred-dollars (\$500).
- G. Upon installation, the “unit cost” for the item will be paid less any prior payments for stored material. Upon installation, an adjustment will be made in payment to account for the quantity of materials actually installed in the Work. The GROUP will not pay for any materials in excess of what is actually installed in the Work.

- H. Payment for “unit price” items (all items except “lump sum” items) will be made monthly until completion of each “unit price” item, based on quantities estimated by CONTRACTOR, and verified by the GROUP’s REPRESENTATIVE. Final payment will be based on quantities calculated by CONTRACTOR from the Record Drawings less any partial payment paid by the GROUP for each Bid Item.

1.07 VARIATIONS IN QUANTITIES AND PRICES

- A. Quantities given in the Contract Documents represent only approximate values, and are provided as a basis for the uniform comparison of submitted Bid Proposals, and the GROUP and the GROUP’s REPRESENTATIVE does not expressly or by implication agree that the actual amount of work will correspond therewith.
- B. CONTRACTOR must provide, for Unit Price Work, a proposed Contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed, and are solely for the purpose of comparing bids. Each such “unit price” will be deemed to include an amount for overhead, profit, and indirect costs for each separately defined Bid Item.
- C. An increase or decrease in the quantity for any “unit price” item shall not be regarded as sufficient grounds for an increase or decrease in the “unit price” of the items except as provided herein.
- D. If the quantity of a “unit price” Bid Item, as stated in the Bid forms, in this Contract is an estimated quantity and the actual quantity of this “unit price” Bid Item varies by more than twenty-five (25) percent above or below the estimated quantity, or above or below twenty-five (25) percent of the sum of quantities for “unit price” work where two sub-items are listed, and the total variance in price of the “unit price” Bid Item would result in a variance equal to or more than ten (10) percent of the Contract base price, an equitable adjustment to the Contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variations below seventy (75) percent of the estimated quantity or above one-hundred-twenty-five (125) percent of the estimated quantity, or sum of quantities for unit price work where two sub-items are listed.
- E. If the quantity variation is such as to cause an increase in the time, relative to the duration of work stated in Contractor’s Baseline Construction Progress Schedule, necessary for completion, CONTRACTOR may request, in writing, an extension of time, to be received by the GROUP’s REPRESENTATIVE within ten (10) days from the beginning of the delay, or within such further period as may be granted by the GROUP’s REPRESENTATIVE before the date of final settlement of the Contract. Upon the receipt of a written request for an extension, the GROUP’s REPRESENTATIVE shall ascertain the facts and make an adjustment for extending the completion date, in the judgment of the GROUP’s REPRESENTATIVE, is justified.

- F. Following completion of the specified In-Situ “Hot Spot” Treatment Field Verification Program (i.e., Bid Item No. 15), equitable adjustments to the “unit prices” for Bid Item No. 16 or 16-A, as stated in the Bid Forms, may be made upon demand of either party, based solely on comparisons between the results and finding of this Field Verification Program and the CONTRACTOR’s bidding assumptions incorporated into said Bid Items and specifically defined within CONTRACTOR’s Bid Proposal, as presented in Exhibit “F” to the Bid Forms. If CONTRACTOR fails to document its design, construction, and bidding assumptions in connection with Bid Items No. 16 and 16-A within its Bid Proposal, CONTRACTOR shall not be granted any adjustment to these Bid Items. If the results and findings of this Field Verification Program cause an increase in the time, relative to the duration of work stated in Contractor’s Baseline Construction Progress Schedule, necessary for completion, CONTRACTOR may request, in writing, an extension of time, to be received by the GROUP’s REPRESENTATIVE within ten (10) days from the beginning of the delay, or within such further period as may be granted by the GROUP’s REPRESENTATIVE before the date of final settlement of the Contract. Upon the receipt of a written request for an extension, the GROUP’s REPRESENTATIVE shall ascertain the facts and make an adjustment for extending the completion date, in the judgment of the GROUP’s REPRESENTATIVE, is justified.

1.08 DEFECT ASSESSMENT

- A. Replace all Work, or portions thereof, not conforming to or in compliance with the Contract Documents at CONTRACTOR’s sole expense.
- B. If, in the opinion of the GROUP’s REPRESENTATIVE, it is not practical to remove and replace the Work, the GROUP’s REPRESENTATIVE will direct one of the following remedies:
1. Remove and replace the defective Work, at CONTRACTOR’s sole expense;
 2. The defective Work may remain, but an adjustment will be made by the GROUP’s REPRESENTATIVE to the “lump sum” or “unit price” for that item; or
 3. The defective Work will be partially repaired to the satisfaction of the GROUP’s REPRESENTATIVE, and an adjustment will be made by the GROUP’s REPRESENTATIVE to the “lump sum” or “unit price” for that item to reflect the defective work.
- C. The individual Specification Sections may modify these options or may identify specific formula or percentages of “lump sum” and/or “unit price” reductions for such defective Work.

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- D. The authority of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER to assess defective Work and identify payment adjustment, if applicable, is final.

1.09 NON-PAYMENT FOR REJECTED PRODUCTS

- A. Payment will not be made for any item not in compliance with the Contract Documents including, but not necessarily limited to, the following:
1. Products wasted or disposed of in a manner that is not acceptable;
 2. Products determined as unacceptable before or after placement;
 3. Products not completely unloaded from the transporting vehicle;
 4. Products placed beyond the lines and levels of the required Work;
 5. Products remaining on hand after completion of the Work;
 6. Loading, hauling and disposing of rejected Products; and
 7. Materials that may be lost or stolen from the project Site.

PART 2 – PRODUCTS

Not used.

PART 3 – BASE CONTRACT PAYMENT ITEMS

3.01 BID ITEM NO. 1: MOBILIZATION/DEMobilIZATION (LUMP SUM)

A. Measurement:

1. The Work required for this bid item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for engineering and work plan development leading up to initiation of field construction activities; mobilization and demobilization of all labor, owned and rented equipment, and materials to and from the Site; CONTRACTOR-provided utilities and temporary facilities; insurance; on-going related expenses considered normal for administration of the Work; and all other requirements of the Work not covered in other Bid Items. Initial development of items required for job execution shall be considered part of this Bid Item including, but not limited to, preparation of the Baseline Construction Progress Schedules, initial construction photographs and video, additional subsurface investigations, temporary modifications to existing fences, establishment of staging and parking areas, procurement of temporary service contracts (i.e., electric, telephone, water, sewer), and location of existing Site features (e.g., utilities) in accordance with the requirements of the Contract Documents.

2. Payment for this item shall also include full compensation for the preparation of initial written plans and submittals, cost items generally associated with Division 1 of the Specifications, excluding the Health and Safety Plan (HASP), which is compensated under Bid Item No. 5 and the Soil Erosion and Sedimentation Control Plan, which is compensated under Bid Item No. 6, permit applications not explicitly covered under other Bid Items, and incidentals to the Work not directly associated with the other Bid Items.
3. Twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's first/initial payment request following mobilization of sufficient labor, equipment, and materials to progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price, until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's final payment request, submitted in accordance with the Contract.
4. The total price paid for this Bid Item shall not exceed six (6) percent of the original total Contract amount/value.

3.02 BID ITEM NO. 2: SURVEYING AND FIELD ENGINEERING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and materials associated with staking, construction surveying, surveys for measurement and payment, and preparation and maintenance of the require record "as-built" drawings and supporting documentation, in accordance with the requirements of the Contract Documents.
2. Progress payments shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

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3.03 BID ITEM NO. 3: PERFORMANCE BOND (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for supplying a performance bond in accordance with the Contract Documents.
2. Payment of this lump sum Bid Item shall be in full, less applicable retainage, with CONTRACTOR's initial payment request.

3.04 BID ITEM NO. 4: PAYMENT BOND (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for supplying a payment bond in accordance with the Contract Documents.
2. Payment of this lump sum Bid Item shall be in full, less applicable retainage, with CONTRACTOR's initial payment request.

3.05 BID ITEM NO. 5: HEALTH AND SAFETY & AIR MONITORING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and materials necessary to provide all appropriate and qualified health and safety and air monitoring personnel, equipment, and supplies to prepare and implement CONTRACTOR's Site-specific Health and Safety Plan (HASP), which shall be submitted to and not disapproved by the REMEDIAL DESIGNER and GROUP's REPRESENTATIVE, in accordance with the requirements of the Contract Documents.
2. Twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's first/initial payment request, provided it has submitted

and received approval of its Site-specific HASP and satisfactory evidence of mobilization of sufficient labor, equipment, and material to adequately progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's final payment request, as submitted in accordance with the Contract.

3.06 BID ITEM NO. 6: SOIL EROSION AND SEDIMENT CONTROL (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to furnish, install, maintain, and remove, as directed by the GROUP's REPRESENTATIVE, temporary and permanent erosion and sedimentation control measures including, but not limited to, erosion control matting, silt fencing, diversion berms/channels, seeding, and sedimentation traps, as required by CONTRACTOR's Site Erosion and Sedimentation Control Plan and as deemed necessary by the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and/or the QUALITY ASSURANCE OFFICER (QAO) to control erosion and sedimentation during construction activities, in accordance with the requirements of the Contract Documents.
2. The lump sum price for this Bid Item shall also include all costs incurred by CONTRACTOR to prepare its Site-specific Soil Erosion and Sedimentation Control Plan, which shall outline and describe CONTRACTOR's construction sequencing and corresponding soil erosion and sedimentation control measures to be implemented by the CONTRACTOR during its construction efforts, in accordance with the requirements of the Contract Documents.
3. Twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's first/initial payment request, provided it has submitted and received approval of its Soil Erosion and Sedimentation Control Plan and satisfactory evidence of mobilization of sufficient labor, equipment, and material to adequately progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be

paid with CONTRACTOR's final payment request, as submitted in accordance with the Contract.

4. No material payments will be granted for this Bid Item.

3.07 BID ITEM NO. 7: CLEARING AND GRUBBING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all clearing, grubbing, handling, chipping, loading, hauling, and disposing or composting of all existing vegetative materials and surface debris to prepare areas to receive the proposed new soil cover system, perimeter drainage channels, access roads within the limits of disturbance, as shown on the Contract Drawings. Off-site disposal of cleared and grubbed materials shall be at a facility approved by the GROUP's REPRESENTATIVE.
2. Progress payments shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.08 BID ITEM NO. 8: REMOVE EXISTING GEOMEMBRANE AND SUBGRADE PREPARATION (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor and equipment to: a) sequentially and systematically remove and dispose off-Site the existing 60-mil geomembrane, and its underlying 120-mil, non-woven geotextile cushioning layer; b) draining, removing, and disposing off-Site the existing geomembrane weighting system; c) perform all subgrade preparation activities excluding the import and placement of grading fill, which shall be compensated under Bid Item No. 9; and d) prepare areas to receive the proposed new soil cover

system, perimeter drainage channels, access roads within the limits of disturbance, as indicated in the Contract Drawings.

2. Off-site disposal of the existing geomembrane materials shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the lump sum price bid for this Bid Item shall include all necessary testing and characterization costs, as required by the designated disposal facility.
3. Progress payments shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
4. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.09 BID ITEM NO. 9: PLACE GRADING FILL (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, compacted Cubic Yards at locations of placement.
2. Measurement will be made by comparing before (i.e., prior to placement of grading fill, but following completion of subgrade preparation Work) and after (i.e., following placement of grading fill and surface re-grading Work) field record surveys of proposed new soil cover system subgrade elevations, as defined by the Contract Drawings and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to excavate, load, haul (from anywhere on-Site), unload, sort, prepare (crushing, shredding, mixing with soil), place, grade, and compact existing fill materials, which underlie the existing geomembrane, in accordance with the Contract Documents. Should additional grading fill be required to attain the specified new cover system subgrade elevations, as defined by the Contract Drawings or as directed by the GROUP's REPRESENTATIVE, additional grading fill shall be obtained from approved off-Site borrow sources, and payment for the delivery, placement, and compaction of this additional grading fill shall be made under this Bid Item.
2. Progress payments shall be made based on estimated in-place, compacted volumes, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

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3. Final payment shall be based on the final in-place, compacted volume of grading fill, as determined by comparing before (i.e., prior to placement of grading fill, but following completion of subgrade preparation Work) and after (i.e., following placement of grading fill and surface re-grading Work) field record surveys in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments. Final payment shall only be based on actual fill quantities, and not on cut quantities, as determined from pre- and post-subgrade surveys irrespective of whether these quantities balance.
4. No material payments will be granted for this Bid Item.

3.10 BID ITEM NO. 10: INSTALL GEOSYNTHETIC CLAY LINER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified geosynthetic clay liner, as required by the Contract Documents.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. This Bid Item does not include payment for any subgrade preparation and placement of grading fill Work to achieve the specified new cover system subgrade elevations, as defined by the Contract Drawings, which are covered in Bid Items No. 8 and/or 9.
5. Material payments for the geosynthetic clay liner delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices

that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.

6. Progress payments for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of geosynthetic clay liner materials.
7. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.11 BID ITEM NO. 11: INSTALL NEW GEOMEMBRANE (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified new geomembrane, as required by the Contract Documents.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. Material payments for the new geomembrane delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with

CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.

5. Progress payments for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of new geomembrane materials.
6. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.12 BID ITEM NO. 12: INSTALL GEOCOMPOSITE DRAINAGE LAYER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified geocomposite drainage layer, as required by the Contract Documents.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. Material payments for the geocomposite drainage layer delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with

CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.

5. Progress payments for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of geocomposite drainage layer materials.
6. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.13 BID ITEM NO. 13: PLACE COVER SOIL (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, grade, and compact the required 18-inch-thick (min.) cover soil layer, as specified by the Contract Documents.
2. Actual planimetric areas will be measured for payment.
3. Progress payments shall be made based on estimated in-place, compacted planimetric areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment shall be based on the final in-place, compacted planimetric areas of the cover soil layer, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.
5. No material payments will be granted for this Bid Item.

3.14 BID ITEM NO. 14: PLACE VEGETATIVE SUPPORT LAYER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, and grade the required 6-inch-thick (min.) vegetative support layer, as specified by the Contract Documents.
2. Actual planimetric areas will be measured for payment.
3. Progress payments shall be made based on estimated in-place, compacted planimetric areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment shall be based on the final in-place, compacted planimetric areas of the cover soil layer, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.
5. No material payments will be granted for this Bid Item.

3.15 BID ITEM NO. 15: IN-SITU "HOT SPOT" TREATMENT FIELD VERIFICATION PROGRAM (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. CONTRACTOR shall undertake and complete this Bid Item on a Guaranteed Maximum Price (GMP) basis with a Satisfactory Completion Incentive to be administered in accordance with the provisions presented herein.
2. The GMP for this Bid Item shall be full compensation for all labor, equipment, and materials to undertake and complete the required In-Situ "Hot Spot" Treatment Field Verification Program, as specified in Section 02450 of the Technical Specifications. Furthermore, all labor,

- equipment, and materials used in this field verification program shall be identical to CONTRACTOR's anticipated, planned In-Situ "Hot Spot" Treatment Production Operation methods.
3. This In-Situ "Hot Spot" Field Verification Program shall have a minimum duration of two (2) consecutive calendar weeks (i.e., 14 days), and during this period, CONTRACTOR shall demonstrate to what degree its combined In-Situ Air Stripping (ISAS) and In-Situ Soil Stabilization (ISS) operations can achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
 4. This Bid Item shall also include a minimum "stand-by" period of four (4) consecutive calendar weeks, following completion of the specified field verification program and prior to commencing production operations, to allow adequate time for the review and evaluation of the collected Quality Control data associated with this Bid Item.
 5. CONTRACTOR shall undertake and complete the specified In-Situ "Hot Spot" Treatment Field Verification Program to the satisfaction of the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER. In addition, CONTRACTOR shall use all of its best efforts and exhaust all reasonable options/alternatives to achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications. At a minimum, this Field Verification Program shall consider and establish, but not be limited to, the following: a) ISAS mixing procedures, rate, and durations; b) ISS design mix requirements (i.e., reagent proportions); and c) relative benefits of various ISAS mixing mediums (i.e., ambient air, steam, and oxidizing agents), as necessary.
 6. This Bid Item shall include all costs associated with the preparation and submission of all required local, state, and federal permits in connection with this Work. In addition, this Bid Item shall include all costs associated with the required In-Situ "Hot Spot" Treatment Work Plan and other required submittals, and this work plan shall include allowances for variations in mixing procedures, rates, and hold times. In addition, this plan shall include provisions for evaluating different mixing/reagent materials, as necessary.
 7. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.

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8. Payment of this GMP Bid Item shall be in full, less applicable retainage, upon satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE. The overall cost of this Bid Item shall not exceed the GMP, and the GROUP will not consider or grant any Change Orders in connection with this Bid Item.
9. If CONTRACTOR is able to demonstrate that its ISAS and ISS operations are effective and reproducible and can achieve the specified In-Situ "Hot Spot" Treatment performance criteria, as defined in Section 02450 of the Technical Specifications, within a shorter time period than that stipulated herein, or with a more cost-effective in-situ treatment approach, the GROUP will issue CONTRACTOR an additional Satisfactory Completion Incentive in the amount of fifty (50) percent of the GMP for this Bid Item.

3.16 BID ITEM NO. 16: IN-SITU "HOT SPOT" TREATMENT PRODUCTION OPERATIONS (NO OFF-SITE DISPOSAL) (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, treated Cubic Yards at locations of In-Situ "Hot Spot" Treatment.
2. Measurement will be made by multiplying actual planimetric areas of treatment, based on field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE for review and verification, by observed, measured treatment depths, utilizing CONTRACTOR's mixing equipment to establish depths of treatment.

B. Payment:

1. CONTRACTOR shall not undertake or perform any Work under this Bid Item until after the successful and satisfactory completion of Bid Item No. 15, and only upon direction of the GROUP's REPRESENTATIVE.
2. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to undertake and complete the specified In-Situ "Hot Spot" Treatment Production Operations, as specified in the Contract Drawings and in Section 02450 of the Technical Specifications. Furthermore, all labor, equipment, and materials used during these production operations shall be identical to those incorporated, performance tested, and verified under Bid Item No. 15.
3. Per 1.07-F of this Section, following completion of the specified In-Situ "Hot Spot" Treatment Field Verification Program (i.e., Bid Item No. 15), equitable adjustments to the unit price bid for this Bid Item may be made upon demand of either party, based solely on comparisons between the results and findings of the Field Verification Program and

CONTRACTOR's bidding assumptions, as incorporated and presented within Attachment "F" of the Bid Forms. If the unit price for this Bid Item is modified upwards/downwards for any reason and mutually accepted by the both parties, the GROUP will consider this modified unit price to be final, and will not accept any subsequent requests by CONTRACTOR to modify this unit price, based on actual labor, equipment, and material costs incurred over the entire duration of this Bid Item.

4. This Bid Item assumes the designated "Hot Spot" will be treated in-situ, and the entire treated mass will achieve the specified performance criteria, as defined in Section of 02450 of the Technical Specifications. Therefore, this Bid Item excludes all post-treatment excavation, handling, hauling, and disposal costs of any treated materials that do not achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
5. If any portion of the treated mass does not achieve the specified performance criteria, as defined in Section 02450 of the Technical specifications, the GROUP will consider such portions of the treated mass to represent Defective Work, and CONTRACTOR shall re-treat or continue its In-Situ "Hot Spot" Treatment operations, at no additional cost to the GROUP, until such time the specified performance criteria are achieved.
6. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
7. Progress payments shall be made based on estimated in-place treatment volumes, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
8. Final payment shall be based on final in-place treatment volumes, as determined by multiplying actual planimetric areas of treatment by observed, measured depths of treatment, minus any and all previous progress payments.

3.17 BID ITEM NO. 17: INSTALL NEW SHEET PILE WALL (SQUARE FEET)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of installed Square Feet of new steel sheet piling surface area, project against the walls vertical axis.
2. Measurement will be made by multiplying actual linear feet of installed new steel sheet piling, along the centerline of the sheet pile wall section, by documented installed sheet pile lengths/depths, as presented on the field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the specified new steel sheet piling at the prescribed locations and to the prescribed minimum depths of embedment, as specified by the Contract Documents. CONTRACTOR shall not be compensated for any portions of new steel sheet piling that extend below the prescribed minimum embedment depths, as shown on the Contract Drawings.
2. Progress payments shall be made based on estimated installed surface areas of new steel sheet piling, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment shall be based on final installed surface areas of new steel sheet piling, as determined by multiplying actual linear feet of installed new steel sheet piling by documented installed sheet pile lengths/depths, as presented on the field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.18 BID ITEM NO. 18: CONSTRUCT PERIMETER ACCESS ROAD (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to complete installation of the specified

perimeter access roads, as shown on the Contract Drawings. Construction activities associated with this Work will involve, but may not be limited to, the following: subgrade preparation; installation of base geotextiles; placement of dense graded aggregates; and fine grading.

2. Progress payments shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
4. No material Payment will be granted for this Bid Item.

3.19 BID ITEM NO. 19: PLACE STONE AGGREGATE AND RIP-RAP (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place Cubic Yards at locations of placement.
2. Measurement will be made by comparing before (i.e., prior to placement of stone aggregate and/or rip-rap materials) and after (i.e., following placement of stone aggregate and/or rip-rap materials) field record surveys, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, and grade the required stone aggregate and rip-rap materials within the perimeter drainage channels, as specified in the Contract Documents and as directed by the REMEDIAL DESIGNER.
2. Progress payments shall be made based on estimated in-place volumes, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment shall be based on the final in-place volume of stone aggregate and rip-rap material, as determined by comparing before (i.e., prior to placement of stone aggregate and rip-rap materials) and after (i.e., following placement of stone aggregate and rip-rap materials) field record surveys in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

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3.20 BID ITEM NO. 20: INSTALL 12-IN-DIA ROAD CULVERT (LINEAR FEET)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place Linear Feet of installed piping.
2. Measurement will be based on actual measure lengths of installed piping, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the required 12-in-dia. roadway culvert within the perimeter drainage channels and as directed by the REMEDIAL DESIGNER, as specified by the Contract Documents.
2. Progress payments shall be made based on estimated lengths of installed piping, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment shall be based on the final installed lengths of piping, as presented on the field record drawings prepared by CONTRACTOR and in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.21 BID ITEM NO. 21: DEMOLITION (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall include full compensation for all labor and equipment to demolish the existing single-story building structure located on-Site, as identified in the Contract Drawings, and its appurtenances, and for proper characterization and disposal of all demolition materials and debris off-Site. This Bid Item shall include all identification, location, disconnecting, and decommissioning of utility services to this existing building. In addition, this Bid Item includes all necessary hazardous material surveys, abatement, and proper disposal of all hazardous materials, if any, off-Site.

2. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove the existing mobile trailer, as identified in the Contract Drawings, and for return of said mobile trailer to its leasing company. This Bid Item shall include all identification, location, disconnecting, and decommissioning of utility services to this existing mobile trailer.
3. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to demolish the identified existing groundwater extraction system header/piping, Above-ground Storage Tank, and associate appurtenances, as identified in the Contract Drawings, and for proper disposal of all demolition materials and debris off-Site. In addition, this Bid Item shall include the off-Site disposal of stockpiled pre-existing groundwater extraction system headers/piping, which is located south of the existing building structure to be demolished.
4. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove portions of the existing chain link fence and gates at the locations indicated on the Contract Drawings and as directed by the GROUP's REPRESENTATIVE, including off-Site disposal of the posts, fabric, and concrete, filling the remaining post holes with cover soil, and/or hydrated bentonite chips, and seeding.
5. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove the identified Investigation Derived Waste (IDW) materials that currently resides on-Site inside and around the existing building structure to be demolished. If these IDW materials satisfy the requirements of grading fill, they may be reused on-Site, and if not reused on-Site, CONTRACTOR shall dispose of said IDW materials off-Site, and all costs associated with the characterization and off-Site disposal of any identified IDW materials shall be included under this Bid Item.
6. This lump sum price bid for this Bid Item shall include all Work identified on the Contract Drawings and in Section 02060 of the Technical Specifications. In addition, this Bid Item shall include all costs associated with the preparation and filing of any local, state, and/or federal permits required for this Work, as necessary.
7. Progress payments shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
8. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.22 BID ITEM NO. 22: WELL DECOMMISSIONING (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit removed.
2. Measurement will be based on actual numbers of removed wells and/or piezometers, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor and equipment to drill and backfill (i.e., with grout) all identified wells and/or piezometers requiring decommissioning, as indicated in the Contract Drawings. This Bid Item shall include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare and submit all require well decommission reports with the New Jersey Department of Environmental Protection (NJDEP).
2. Progress payments shall be made based on actual numbers of decommissioned wells and/or piezometers, as reviewed and verified by the GROUP's REPRESENTATIVE.
3. Final payment shall be based on the final number of decommissioned wells and/or piezometers, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.23 BID ITEM NO. 23: INSTALL NEW PERIMETER CHAIN LINK FENCE (LINEAR FOOT)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to in the units of Linear Feet of installed chain link fence.
2. Measurement will be based on actual lengths of installed chain link fence, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

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B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to install new chain link fence at locations indicated on the Contract Drawings, including procurement, delivery, and installation of posts, fabric, supports, gates, and barbed wire, as well as physical connections to the proposed new steel sheet pile wall, grading around the base of the post holes to promote positive drainage, and the procurement and installation of warning signs, in accordance with the requirements of the Contract Documents, and as directed by the GROUP's REPRESENTATIVE.
2. This Bid Item excludes all costs associated with the removal of any portions of the existing chain link fence and gates at the locations indicated on the Contract Drawings and as directed by the GROUP's REPRESENTATIVE, including off-Site disposal of the posts, fabric, and concrete, filling the remaining post holes with cover soil, and/or hydrated bentonite chips, and seeding. All costs associated with the removal of any portions of the existing chain link fence shall be compensated under Bid Item No. 21.
3. Except for tie wires, fabric bands, lock wires, and concrete foundations, fence materials removed may be salvaged to the extent possible for reinstallation in accordance with the Contract Documents. Fabric proposed for reuse shall be subject to favorable review by the GROUP's REPRESENTATIVE prior to reuse. CONTRACTOR shall indicate to the GROUP's REPRESENTATIVE the cost savings that can be realized by re-using the previously removed fence fabric, and this amount will be deducted from the payment application submitted following the completion of the fence installation.
4. Progress payments shall be made based on actual lengths of installed new chain link fence, as reviewed and verified by the GROUP's REPRESENTATIVE.
5. Final payment shall be based on the final lengths of installed new chain link fence, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
6. No material payments will be granted with this Bid Item.

3.24 BID ITEM NO. 24: INSTALL PRE-ENGINEERED METAL BUILDING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

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B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to provide “design-build” services for the erection of a pre-fabricated, pre-engineered metal building with all identified appurtenances (i.e., Above-ground Storage tank, compressor, controls, etc.), as specified in the Contract documents. This Bid Item includes all interior finishes, utility services (water, gas, sanitary sewer, electric, and telephone), interior mechanical, electrical, and plumbing systems, so that the building is completely operational, as intended by the GROUP. This Bid Item also includes the development of construction-level drawings for the GROUP’s approval, and for obtaining all necessary local, state, and federal approvals and permits. CONTRACTOR shall identify and furnish all miscellaneous interior finish items not specified, and show proposed foundation modifications, as necessary, to suit the pre-engineered metal building structure.
2. Progress payments shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP’s REPRESENTATIVE.
3. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP’s REPRESENTATIVE, minus any and all previous progress payments.
4. No material payments will be granted with this Bid Item.

3.25 BID ITEM NO. 25: INSTALL GROUNDWATER RECOVERY WELLS (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit installed.
2. Measurement will be based on actual numbers of new groundwater recovery wells installed, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor, equipment, and materials to drill and install the identified new groundwater recovery wells, as specified in the Contract Drawings (see Contract Drawings No. SCP-7 and SCP-8) and as directed by the Remedial Designer. This Bid Item shall include all excavation, dewatering, handling of materials, installation of vaults, access hatches, pumps, and well casings, placement of the specified filter stone around said well casings, and providing all system controls and connections to

carrier pipes and pneumatic/discharge lines/headers. This Bid Item shall also include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare, submit, and obtain all necessary well drilling permits from NJDEP.

2. For purposes of bidding and payment, CONTRACTOR shall assume each new groundwater recover well will be installed fifteen (15) feet beneath the proposed final grades of the new cover system, and this Bid Item includes all appropriate provisions and materials to achieve these installed depths.
3. Progress payments shall be made based on actual numbers of new groundwater recovery wells installed, as reviewed and verified by the GROUP's REPRESENTATIVE.
4. Final payment shall be based on the final number of new groundwater recovery wells installed, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
5. No material payments will be granted with this Bid Item.

3.26 BID ITEM NO. 26: INSTALL GROUNDWATER RECOVERY SYSTEM CARRIER PIPES (LINEAR FOOT)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to in the units of Linear Feet of installed groundwater recovery system carrier pipes.
2. Measurement will be based on actual lengths of installed groundwater recovery system carrier pipes, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the required new groundwater recovery system carrier pipes, as specified by the Contract Documents and as directed by the REMEDIAL DESIGNER. This Bid Item shall include, but may not be limited to, all excavation, temporary stockpiling of excavated materials, regrading of excess materials beneath the new soil cover system, dewatering, backfill, and compaction Work. In addition, this Bid Item shall include the installation of all pneumatic compressed air supply lines/tubing and

liquid discharge lines, which reside within the “Primary” carrier pipe, as indicated on the Contract Drawings.

2. Progress payments shall be made based on actual lengths of installed new groundwater recovery system carrier pipes, as reviewed and verified by the GROUP’s REPRESENTATIVE.
3. Final payment shall be based on the final lengths of installed new groundwater recovery system carrier pipes, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP’s REPRESENTATIVE, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.27 BID ITEM NO. 27: INSTALL NEW PIEZOMETERS (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit installed.
2. Measurement will be based on actual numbers of new piezometers installed, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor, equipment, and materials to drill and install the identified new piezometers, as specified in the Contract Drawings (see Contract Drawings No. SCP-7 and No. SCP-8) and as directed by the Remedial Designer. This Bid Item shall include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare, submit, and obtain all necessary well drilling permits from NJDEP.
2. For purposes of bidding and payment, CONTRACTOR shall assume each new piezometer will be installed fifteen (15) feet beneath the proposed final grades of the new cover system, and this Bid Item includes all appropriate provisions and materials to achieve these installed depths.
3. Progress payments shall be made based on actual numbers of new piezometers installed, as reviewed and verified by the GROUP’s REPRESENTATIVE.

4. Final payment shall be based on the final number of new piezometers installed, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
5. No material payments will be granted with this Bid Item.

3.28 BID ITEM NO. 28: INSTALL NON-WOVEN GEOTEXTILES (SQUARE YARD)

A. Measurement:

3. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at locations of placement.
4. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified non-woven geotextile materials, as specified in the Contract Documents.
2. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
3. Material payments for the non-woven geotextile materials delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
4. Progress payments for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of non-woven geotextile materials.
5. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed

quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

PART 4 – ALTERNATE CONTRACT PAYMENT ITEMS

4.01 ALTERNATE BID ITEM NO. 16-A: IN-SITU "HOT SPOT" TREATMENT PRODUCTION OPERATIONS (WITH OFF-SITE DISPOSAL) (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, treated Cubic Yards at locations of In-Situ "Hot Spot" Treatment.
2. Measurement will be made by multiplying actual planimetric areas of treatment, based on field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE for review and verification, by observed, measured treatment depths, utilizing CONTRACTOR's mixing equipment to establish depths of treatment.

B. Payment:

1. CONTRACTOR shall not undertake or perform any Work under this Bid Item until after completion of Bid Item No. 15, and only upon direction of the GROUP's REPRESENTATIVE.
2. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to undertake and complete the specified In-Situ "Hot Spot" Treatment Production Operations, as specified in the Contract Drawings and in Section 02450 of the Technical Specifications. Furthermore, all labor, equipment, and materials used during these production operations shall be identical to those incorporated and performance tested under Bid Item No. 15.
3. Per 1.07-F of this Section, following completion of the specified In-Situ "Hot Spot" Treatment Field Verification Program (i.e., Bid Item No. 15), equitable adjustments to the unit price bid for this Bid Item may be made upon demand of either party, based solely on comparisons between the results and findings of the Field Verification Program and CONTRACTOR's bidding assumptions, as incorporated and presented within Attachment "F" of the Bid Forms. If the unit price for this Bid Item is modified upwards/downwards for any reason and mutually accepted by the both parties, the GROUP will consider this modified unit price to be final, and will not accept any subsequent requests by CONTRACTOR to modify this unit price, based on actual labor, equipment, and material costs incurred over the entire duration of this Bid Item.

4. This Bid Item assumes the designated “Hot Spot” will be treated in-situ, but the specified In-Situ “Hot Spot” Treatment performance criteria, as defined in Section of 02450 of the Technical Specifications, cannot be reasonable achieved to the satisfaction of the USEPA and NJDEP. Therefore, this Bid Item includes all in-situ treatment operations and all post-treatment excavation, handling, hauling, characterization, and disposal costs for those portions of the treated mass that do not achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
5. This Bid Item shall also include all additional health and safety measure, air emission control, and quality control costs required during the post-treatment excavation and off-Site disposal operations. In addition, this Bid Item shall include all costs associated with the infilling of these post-treatment excavations, including the import of additional grading fill, as necessary, and all backfilling and compaction costs, as required.
6. Those portions of the treated mass that do achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications shall remain on-Site, and payment for these portions of the Work will be compensated under Bid Item No. 16.
7. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project’s designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
8. Progress payments shall be made based on estimated in-place treatment volumes, as prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification.
9. Final payment shall be based on final in-place treatment volumes, as determined by multiplying actual planimetric areas of treatment by observed, measured depths of treatment, minus any and all previous progress payments.

***** END OF SECTION *****

RECORD OF BOREHOLE RD-1

SHEET 1 of 1

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 34.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Location Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/13/05
 DATE COMPLETED: 9/13/05
 WEATHER: Sunny

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 4.5 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 88 degrees (F)

INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | SAMPLES | | | | | | COMMENTS | |
|------------|----------------|--|-------|-------------|------------------|--------|------|-----------|---|-------|------------|--|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. DEPTH (ft) | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in 140 lb hammer 30 inch drop | N | | REC/ATT |
| 0 | | 0.0 - 4.0 Brown miscellaneous FILL, including silty sand, rock, wood and brick fragments | | | | | | | | | | Description of FILL based on observed drill cuttings. Auger to 4.0 FT BGS without sampling, FILL |
| 5 | 0 | 4.0 - 6.0 Black fibrous PEAT, with pieces of wood and brick fragments (FILL?) | PT | | 4.0 | S1 | SS | 2.1 | 3-4-4-4 | 8 | 0.5 2.0 | Wc = 24.07% |
| | | 6.0 - 8.0 Black fibrous PEAT with pieces of wood fragments and gravel (FILL?) | PT | | 6.0 | S2 | SS | 2.5 | 3-3-3-3 | 6 | 2.0 2.0 | Wc = 27.57% |
| | -5 | 8.0 - 10.0 Brown organic SILTY CLAY and PEAT, trace fine gravel | OL-ML | | 8.0 | ST-1 | SH | 3.5 | PUSH | PUSH | 0.3 2.0 | Wc = 63.3%, LL = 85, PI = 38 |
| 10 | | 10.0 - 12.0 Brown SANDY CLAY with some fine gravel | CL-SM | | 10.0 | S3 | SS | 2.2 | 2-3-3-3 | 6 | 2.0 2.0 | Wc = 14.3% |
| | | 12.0 - 14.0 Brown varved CLAY | CH | | 12.0 | S4 | SS | 1070 | 2-2-2-3 | 4 | 2.0 2.0 | Wc = 43.17%, LL = 54, PI = 29 |
| | -10 | 14.0 - 16.0 Brown varved CLAY | CH | | 14.0 | ST-2 | SH | 163 | PUSH | PUSH | 2.0 2.0 | Wc = 45.67%; Su = 568 psf, Cc = 0.4, Cv = 2 x 10^-6 cm^2/sec |
| | | 16.0 - 18.0 Brown varved CLAY | CH | | 16.0 | S5 | SS | 19.2 | 2-2-2-2 | 4 | 2.0 2.0 | Wc = 48.48%, LL = 52, PI = 29 |
| | -15 | 18.0 - 20.0 Brown varved CLAY | CH | | 18.0 | S6 | SS | 4.3 | WOR-1-2-2 | 3 | 2.0 2.0 | Wc = 44.9% |
| 20 | | 20.0 - 21.0 Gray varved CLAY | CH | | 20.0 | | | | | | | |
| | | 21.0 - 22.0 Reddish brown SANDY CLAY with trace fine gravel (GLACIAL TILL) | CL-SM | | 21.0 | S7 | SS | 1.6 | 1-2-2-3 | 4 | 2.0 2.0 | Wc = 14.88% |
| | | 22.0 - 24.0 Brown CLAY with trace fine to coarse sand and fine gravel (GLACIAL TILL) | CL-SM | | 22.0 | S8 | SS | 0.7 | 2-3-16-6 | 19 | 2.0 2.0 | Wc = 28.9% |
| | -20 | 24.0 - 26.0 Reddish brown SANDY CLAY with trace fine gravel (GLACIAL TILL) | SW-SM | | 24.0 | S9 | SS | 1.3 | 2-2-3-2 | 5 | 2.0 2.0 | Wc = 16.05% |
| | | 26.0 - 28.0 Reddish brown SANDY CLAY with trace fine gravel (GLACIAL TILL) | CL-SM | | 26.0 | S10 | SS | 1.0 | 2-2-3-4 | 5 | 2.0 2.0 | Wc = 18.97% |
| | -25 | 28.0 - 30.0 Brown CLAY with trace fine to coarse sand and fine gravel (GLACIAL TILL) | CL-SM | | 28.0 | S11 | SS | 0.9 | 2-3-2-2 | 5 | 2.0 2.0 | Wc = 18.9% |
| 30 | | | | | 30.0 | | | | | | | Auger to 33.0 FT BGS without sampling |
| | | | | | 33.0 | | | | | | | |
| | -30 | 33.0 - 33.3 Reddish brown CLAY with trace to some fine to coarse sand and fine gravel (GLACIAL TILL) Boring completed at 34.0 ft | CL-SM | | 33.3 | S12 | SS | 3.3 | 50/3* | 50/3* | 0.3 2.0 | Boring terminated at 34.0 FT BGS at AUGER REFUSAL in GLACIAL TILL |
| 35 | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | |

AA GEOTECH LOG CARLSTADT RD BORINGS.GPJ GOLDBER NJ-PA.GDT 12/2/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



RECORD OF BOREHOLE RD-2

SHEET 1 of 1

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 39.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Location Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/14/05
 DATE COMPLETED: 9/14/15
 WEATHER: Sunny

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 4.0 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 88 degrees (F)

INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | SAMPLES | | | | | | COMMENTS | |
|------------|----------------|---|-------|-------------|------------------|--------|------|-----------|---|-------|-------------------|---|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. DEPTH (ft) | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in 140 lb hammer 30 inch drop | N | | REC / ATT |
| 0 | 0 | 0.0 - 5.0 Gray miscellaneous FILL including sandy clay, gravel, concrete and brick fragments | | | | | | | | | | Description of FILL based on observed drill cuttings. AUGER to 5.0 FT BGS without sampling, FILL. |
| 5 | 5 | 5.0 - 7.0 Black fibrous PEAT | PT | | -1.0 5.0 | ST-1 | SH | 47.2 | PUSH | PUSH | $\frac{2.0}{2.0}$ | |
| 7 | 7 | 7.0 - 9.0 Black fibrous PEAT to gray organic CLAY with interlayered fine sand | PT-OL | | -3.0 7.0 | ST-2 | SH | 10.7 | PUSH | PUSH | $\frac{2.0}{2.0}$ | Wc = 35.5%; Cc = 0.38, Cv = $4 \times 10^{-3} \text{ cm}^2/\text{sec}$ |
| 9 | 9 | 9.0 - 11.0 Gray varved CLAY | CH | | -5.0 9.0 | S1 | SS | 4.2 | 4-3-4-4 | 7 | $\frac{2.0}{2.0}$ | Wc = 41.94%, LL = 51, PI = 26 |
| 11 | 11 | 11.0 - 13.0 Grayish brown varved CLAY | CH | | -7.0 11.0 | S2 | SS | 1.2 | 5-5-5-4 | 10 | $\frac{2.0}{2.0}$ | Wc = 43.1% |
| 13 | 13 | 13.0 - 15.0 Grayish brown varved CLAY | CH | | -9.0 13.0 | ST-3 | SH | 4.4 | PUSH | PUSH | $\frac{2.0}{2.0}$ | Wc = 52.17%, Su = 217 psf |
| 15 | 15 | 15.0 - 17.0 Grayish brown varved CLAY | CH | | -11.0 15.0 | S3 | SS | 0.3 | 1-1-1-1 | 2 | $\frac{2.0}{2.0}$ | Wc = 45.53%, LL = 53, PI = 29 |
| 17 | 17 | 17.0 - 18.0 Brown varved CLAY | CH | | -13.0 17.0 | S4 | SS | N/A | 2-3-4-4 | 7 | $\frac{2.0}{2.0}$ | Wc = 38.1% |
| 18 | 18 | 18.0 - 19.0 Brown SANDY CLAY with trace fine gravel (GLACIAL TILL) | CL-SM | | -14.0 18.0 | | | | | | | |
| 19 | 19 | 19.0 - 21.0 Reddish brown SANDY CLAY with little fine gravel (GLACIAL TILL) | CL-SM | | -15.0 19.0 | ST-4 | SH | 10.8 | PUSH | PUSH | $\frac{1.0}{2.0}$ | Wc = 35.5%, LL = 36, PI = 17 |
| 21 | 21 | 21.0 - 23.0 Brown CLAY with trace to little fine sand and gravel (GLACIAL TILL) | CL-SM | | -17.0 21.0 | S5 | SS | 0.5 | 4-5-7-7 | 12 | $\frac{2.0}{2.0}$ | Wc = 15.2% |
| 23 | 23 | 23.0 - 25.0 Reddish brown SANDY CLAY with little fine gravel (GLACIAL TILL) | CL-SM | | -19.0 23.0 | S6 | SS | 0.9 | 4-3-8-15 | 11 | $\frac{2.0}{2.0}$ | Wc = 17.32% |
| 25 | 25 | | | | -21.0 25.0 | | | | | | | AUGER to 28.0 FT BGS without sampling |
| 28 | 28 | 28.0 - 30.0 Reddish brown SANDY CLAY with little fine sand and gravel (GLACIAL TILL) | CL-SM | | -24.0 28.0 | S7 | SS | 0.2 | 8-20-22-13 | 42 | $\frac{2.0}{2.0}$ | Wc = 14.45% |
| 30 | 30 | | | | -26.0 30.0 | | | | | | | AUGER to 33.0 FT BGS without sampling |
| 33 | 33 | 33.0 - 35.0 Brown CLAY and fine to medium sand with little fine gravel (GLACIAL TILL) | CL-SM | | -29.0 33.0 | S8 | SS | 0.1 | 8-9-7-15 | 16 | $\frac{2.0}{2.0}$ | Wc = 13.9% |
| 35 | 35 | | | | -31.0 35.0 | | | | | | | AUGER to 38.0 FT BGS without sampling |
| 38 | 38 | 38.0 - 38.3 Reddish brown SILTY CLAY with little fine gravel (GLACIAL TILL) Boring completed at 39.0 ft | CL-SM | | -34.0 -35.0 | S9 | SS | 1.1 | 50/4* | 50/4* | $\frac{0.3}{2.0}$ | Boring terminated at 39.0 FT BGS at AUGER REFUSAL in GLACIAL TILL |

AA GEOTECH LOG CARLSTADT RD BORINGS.GPJ_GOLDER NJ-PA.GDT 12/2/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



RECORD OF BOREHOLE RD-3

SHEET 1 of 2
 INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 42.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Location Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/15/05
 DATE COMPLETED: 9/15/05
 WEATHER: Rain/Overcast

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 3.5 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 85 degrees (F)

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | | SAMPLES | | | | | | COMMENTS |
|------------|----------------|--|-------|-------------|------------|---------|------|-----------|---|------|------------|---|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in 140 lb hammer 30 inch drop | N | REC / ATT | |
| | | | | | DEPTH (ft) | | | | | | | |
| 0 | | 0.0 - 2.0 Gray miscellaneous fill including sandy clay, gravel, brick and concrete fragments (FILL) | | | 1.5 | | | | | | | Description of FILL based on observed drill cuttings and split spoon sample. AUGER to 2.0 FT BGS without sampling, FILL |
| | | 2.0 - 4.0 Gray miscellaneous fill including sandy clay, gravel, brick and concrete fragments (FILL) | | | 2.0 | S1 | SS | 0.0 | 7-5-4-4 | 9 | 1.0 2.0 | |
| 0 | | 4.0 - 6.0 Gray miscellaneous fill including sandy clay, gravel, brick and concrete fragments (FILL) | | | -0.5 | | | | | | | AUGER to 6.0 FT BGS without sampling, FILL |
| | | 6.0 - 8.0 Black fibrous PEAT | PT | | 4.0 | | | | | | | |
| 5 | | 6.0 - 8.0 Black fibrous PEAT | PT | | -2.5 | | | | | | | Wc = 50.34% |
| | | 8.0 - 10.0 No Recovery | | | 6.0 | ST-1 | SH | 22.9 | PUSH | PUSH | 1.0 2.0 | |
| | | 8.0 - 10.0 No Recovery | | | -4.5 | | | | | | | Attempt Shelby Tube 8.0 to 10.0 FT BGS, resistance encountered at 9.0 FT BGS. Abort Shelby Tube attempt, no recovery. |
| | | 10.0 - 12.0 Black CLAYEY SAND to red brown varved CLAY | CL-SM | | 8.0 | ST-1a | SH | N/A | PUSH | PUSH | 0.0 2.0 | |
| 10 | | 10.0 - 12.0 Black CLAYEY SAND to red brown varved CLAY | CL-SM | | -6.5 | | | | | | | Wc = 31.07%, LL = 36, PI = 18 |
| | | 12.0 - 14.0 Reddish brown varved CLAY | CL | | 10.0 | S2 | SS | 15.9 | 9-8-8-9 | 16 | 2.0 2.0 | |
| | | 12.0 - 14.0 Reddish brown varved CLAY | CL | | -8.5 | | | | | | | Wc = 37.80% |
| | | 14.0 - 16.0 Gray varved CLAY | CL | | 12.0 | S3 | SS | 7.6 | 3-3-3-2 | 6 | 2.0 2.0 | |
| 15 | | 14.0 - 16.0 Gray varved CLAY | CL | | -10.5 | | | | | | | Wc = 38.78%, Su = 632 psf |
| | | 16.0 - 18.0 Brown varved CLAY | CH | | 14.0 | ST-2 | SH | 0.1 | PUSH | PUSH | 2.0 2.0 | |
| | | 16.0 - 18.0 Brown varved CLAY | CH | | -12.5 | | | | | | | Wc = 54.0%, LL = 56, PI = 31 |
| | | 18.0 - 20.0 Gray varved CLAY | CH | | 16.0 | S4 | SS | 0.0 | WOH-WOH | 0 | 2.0 2.0 | |
| | | 18.0 - 20.0 Gray varved CLAY | CH | | -14.5 | | | | | | | Wc = 48.79%; Cc = 0.64, Cv = 5 x 10 ⁻⁶ cm ² /sec |
| | | 20.0 - 21.0 Gray varved CLAY | CH | | 18.0 | ST-3 | SH | 0.6 | PUSH | PUSH | 2.0 2.0 | |
| 20 | | 20.0 - 21.0 Gray varved CLAY | CH | | -16.5 | | | | | | | Wc = 39.15% |
| | | 21.0 - 22.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | 20.0 | S5 | SS | 0.0 | WOR-WOR | 0 | 2.0 2.0 | |
| | | 21.0 - 22.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | -17.5 | | | | | | | Wc = 14.4% |
| | | 22.0 - 24.0 Brown CLAY and fine to coarse sand with little fine gravel (GLACIAL TILL) | CL-SM | | 21.0 | S6 | SS | 0.0 | 1-2-1-2 | 3 | 2.0 2.0 | |
| 25 | | 22.0 - 24.0 Brown CLAY and fine to coarse sand with little fine gravel (GLACIAL TILL) | CL-SM | | -18.5 | | | | | | | AUGER to 28.0 FT BGS without sampling |
| | | | | | 22.0 | | | | | | | |
| | | | | | -20.5 | | | | | | | AUGER to 28.0 FT BGS without sampling |
| | | | | | 24.0 | | | | | | | |
| | | | | | -24.5 | | | | | | | Wc = 20.18% |
| | | 28.0 - 30.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | 28.0 | S7 | SS | 0.0 | 10-12-21-39 | 33 | 2.0 2.0 | |
| 30 | | 28.0 - 30.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | -26.5 | | | | | | | AUGER to 33.0 FT BGS without sampling |
| | | | | | 30.0 | | | | | | | |
| | | | | | -29.5 | | | | | | | Wc = 14.9% |
| | | 33.0 - 35.0 Brown CLAY and fine to coarse sand with some fine gravel (GLACIAL TILL) | CL-SM | | 33.0 | S8 | SS | 0.0 | 17-23-28-32 | 51 | 2.0 2.0 | |
| 35 | | 33.0 - 35.0 Brown CLAY and fine to coarse sand with some fine gravel (GLACIAL TILL) | CL-SM | | -31.5 | | | | | | | AUGER to 38.0 FT BGS without sampling |
| | | | | | 35.0 | | | | | | | |
| | | | | | -34.5 | | | | | | | Wc = 8.93% |
| | | 38.0 - 40.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | 38.0 | S9 | SS | 0.0 | 13-17-35-50/5* | 52 | 2.0 2.0 | |
| 40 | | 38.0 - 40.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | -36.5 | | | | | | | |

Log continued on next page

AA.GEOTECH.LOG CARLSTADT RD BORINGS.GPJ GOLDBER NJ.PA.GDT 12/22/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



RECORD OF BOREHOLE RD-3

SHEET 2 of 2

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 42.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Location Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/15/05
 DATE COMPLETED: 9/15/05
 WEATHER: Rain/Overcast

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 3.5 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 85 degrees (F)

INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | | SAMPLES | | | | | COMMENTS | |
|------------|----------------|-----------------------------|------|-------------|------------|---------|------|-----------|---|---|----------|---|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in 140 lb hammer 30 inch drop | N | | REC / ATT |
| | | | | | DEPTH (ft) | | | | | | | |
| 40 | | | | | 40.0 | | | | | | | AUGER to 42.0 FT BGS without sampling |
| | | Boring completed at 42.0 ft | | | -38.5 | | | | | | | Boring terminated at 42.0 FT BGS at AUGER REFUSAL in GLACIAL TILL |
| -40 | | | | | | | | | | | | |
| -45 | | | | | | | | | | | | |
| -50 | | | | | | | | | | | | |
| -55 | | | | | | | | | | | | |
| -60 | | | | | | | | | | | | |
| -65 | | | | | | | | | | | | |
| -70 | | | | | | | | | | | | |
| -75 | | | | | | | | | | | | |
| -80 | | | | | | | | | | | | |

AA GEOTECH LOG CARLSTADT RD BORINGS.GPJ GOLDBER NJ.PA.GDT 12/2/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



RECORD OF BOREHOLE RD-4

SHEET 1 of 2
 INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 45.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Location Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/16/05
 DATE COMPLETED: 9/16/05
 WEATHER: Overcast

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 4.0 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 82 degrees (F)

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | SAMPLES | | | | | | COMMENTS | |
|------------|----------------|--|-------|-------------|------------------|--------|------|-----------|---|------|-----------|--|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. DEPTH (ft) | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in 140 lb hammer 30 inch drop | N | | REC / ATT |
| 0 | | 0.0 - 4.0 Gray miscellaneous fill including clayey sand, gravel, brick and concrete fragments (FILL) | | | 0.0 | | | | | | | Description of FILL based on observed drill cuttings. AUGER to 4.0 FT BGS without sampling, FILL |
| 5 | | 4.0 - 6.0 Gray miscellaneous fill including green gray silty sand, clayey sand, gravel, brick and concrete fragments (FILL) | | | 4.0 | ST-1 | SH | 0.0 | PUSH | PUSH | 2.0 / 2.0 | Wc = 20.79% |
| | | 6.0 - 8.0 Gray organic CLAY with interlayered fine sand | OL | | 6.0 | ST-2 | SH | 1.2 | PUSH | PUSH | 2.0 / 2.0 | Wc = 20.14%, Su = 770 psf |
| | | 8.0 - 9.0 Gray organic CLAY | OL | | 8.0 | | | | | | | Wc = 30.65% |
| | | 9.0 - 10.0 Gray and brown varved CLAY | CL | | 9.0 | S1 | SS | 0.0 | WOH-5-4-6 | 9 | 2.0 / 2.0 | Wc = 29.84% |
| | | 10.0 - 12.0 Gray and brown varved CLAY | CL | | 10.0 | S2 | SS | 419 | 8-8-7-7 | 15 | 2.0 / 2.0 | Wc = 29.84% |
| | | 12.0 - 14.0 Gray varved CLAY | CL | | 12.0 | ST-3 | SH | 0.0 | PUSH | PUSH | 2.0 / 2.0 | Wc = 35.45%, Su = 707 psf, Cc = 0.32, Cv = 2.5 x 10^-3 cm^2/sec |
| | | 14.0 - 16.0 Grayish brown varved CLAY | CL | | 14.0 | S3 | SS | 7.6 | WOH-WOH | 0 | 2.0 / 2.0 | Wc = 45.3%, LL = 49, PI = 25 |
| | | 16.0 - 18.0 Gray varved CLAY | CL | | 16.0 | S4 | SS | 6.1 | 1-1-1-1 | 2 | 2.0 / 2.0 | Wc = 45.91% |
| | | 18.0 - 20.0 Gray varved CLAY | CL | | 18.0 | ST-4 | SH | 152 | PUSH | PUSH | 2.0 / 2.0 | Wc = 38.50%, Su = 120 psf |
| | | 20.0 - 22.0 Gray varved CLAY | CH | | 20.0 | S5 | SS | 0.0 | WOH-WOH-1-1 | 1 | 2.0 / 2.0 | Wc = 53.05% |
| | | 22.0 - 24.0 Grayish brown varved CLAY | CH | | 22.0 | S6 | SS | 0.0 | 1-1-2-2 | 3 | 2.0 / 2.0 | Wc = 49.9%, LL = 54, PI = 29 |
| | | 24.0 - 26.0 Reddish brown varved CLAY | CH | | 24.0 | S7 | SS | 0.0 | WOH-WOH-1-2 | 1 | 2.0 / 2.0 | Wc = 52.42% |
| | | 26.0 - 28.0 Reddish brown varved CLAY | CH | | 26.0 | S8 | SS | 0.0 | WOH-WOH-2-2 | 2 | 2.0 / 2.0 | Wc = 42.78% |
| | | 28.0 - 30.0 Reddish brown varved CLAY | CH | | 28.0 | S9 | SS | 0.0 | 2-2-3-3 | 5 | 2.0 / 2.0 | Wc = 51.53% |
| | | 30.0 - 32.0 Brown varved CLAY | CH | | 30.0 | S10 | SS | 0.0 | 2-3-3-2 | 6 | 2.0 / 2.0 | Wc = 55.0%, LL = 56, PI = 31 |
| | | 32.0 - 34.0 Reddish brown varved CLAY | CH | | 32.0 | S11 | SS | 0.0 | WOH-WOH-2-2 | 2 | 2.0 / 2.0 | Wc = 48.98% |
| | | 34.0 - 35.0 Reddish brown varved CLAY | CH | | 34.0 | | | | | | | Wc = 40.03% |
| | | 35.0 - 36.0 Reddish brown SANDY CLAY with fine gravel (GLACIAL TILL) | CL-SM | | 35.0 | S12 | SS | 0.0 | 3-3-3-4 | 6 | 2.0 / 2.0 | |
| | | 38.0 - 40.0 Brown CLAY with some fine to coarse sand and little fine gravel (GLACIAL TILL) | CL-SM | | 38.0 | S13 | SS | 0.0 | 5-13-32-50/3* | 45 | 2.0 / 2.0 | Wc = 13.9% |
| 40 | | Log continued on next page | | | | | | | | | | |

AA GEOTECH LOG CARLSTADT RD BORINGS.GPJ_GOLDER.NJ.PA.GDT_12/2/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



RECORD OF BOREHOLE RD-4

SHEET 2 of 2

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 45.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Location Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/16/05
 DATE COMPLETED: 9/16/05
 WEATHER: Overcast

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 4.0 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 82 degrees (F)

INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | SAMPLES | | | | | | COMMENTS | |
|------------|----------------|--|-------|---|------------------|--------|------|-----------|---|-------|------------|--|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. DEPTH (ft) | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in <small>140 lb hammer 30 inch drop</small> | N | | REC / ATT |
| 40 | | | | | 40.0 | | | | | | | AUGER to 43.0 FT BGS without sampling Boring terminated at 45.0 FT BGS at AUGER REFUSAL in GLACIAL TILL |
| | | 43.0 - 45.0 Reddish brown SILTY CLAY with fine gravel (GLACIAL TILL) | CL-SM |  | -39.0 43.0 | S14 | SS | 0.0 | 50/3* | 50/3* | 0.3 2.0 | |
| 45 | | Boring completed at 45.0 ft | | | -41.0 | | | | | | | |
| 45 | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | |

AA GEOTECH LOG CARLSTADT RD BORINGS.GPJ GOLDBER NJ-PA.GDT 12/2/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



RECORD OF BOREHOLE RD-5

SHEET 1 of 2

PROJECT: 216 Paterson Plank Road
 PROJECT NUMBER: 943-6222
 DRILLED DEPTH: 43.0 ft
 AZIMUTH: N/A
 LOCATION: See Boring Locationa Plan

DRILL METHOD: Hollow-Stem Auger
 DRILL RIG: Canterra CT 250
 DATE STARTED: 9/19/05
 DATE COMPLETED: 9/19/05
 WEATHER: Sunny

DATUM:
 COORDS: not surveyed
 GS ELEVATION: 4.5 ft
 TOC ELEVATION: N/A
 TEMPERATURE: 80 degrees (F)

INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

| DEPTH (ft) | ELEVATION (ft) | SOIL PROFILE | | | SAMPLES | | | | | | | COMMENTS | |
|------------|----------------|---|-------|-------------|---------------|--------|------|-----------|---|------|------------|----------|--|
| | | DESCRIPTION | USCS | GRAPHIC LOG | ELEV. | NUMBER | TYPE | PID (ppm) | BLOWS per 6 in 140 lb hammer 30 inch drop | N | REC / ATT | | |
| | | | | | DEPTH (ft) | | | | | | | | |
| 0 | | 0.0 - 6.0 Gray miscellaneous fill including clayey sand, gravel, brick and concrete fragments (FILL) | | | | | | | | | | | Description of FILL based on observed drill cuttings. AUGER to 6.0 FT BGS without sampling, FILL |
| 5 | 0 | 6.0 - 8.0 Black organic CLAY and PEAT | PT-OL | | -1.5 6.0 | ST-1 | SH | 1.3 | PUSH | PUSH | 1.0 2.0 | | Wc = 54.82% |
| | | 8.0 - 10.0 Black fibrous PEAT | PT | | -3.5 8.0 | ST-2 | SH | 1.0 | PUSH | PUSH | 2.0 2.0 | | Wc = 41.15%, Cc = 0.27, Cv = 2.4 x 10 ⁻³ cm ² /sec |
| 10 | -5 | 10.0 - 12.0 Gray and brown varved CLAY | CL | | -5.5 10.0 | S1 | SS | 28.2 | 6-8-7-7 | 15 | 2.0 2.0 | | Wc = 30.97%, LL = 37, PI = 15 |
| | | 12.0 - 14.0 Gray varved CLAY with pieces of wood | CL | | -7.5 12.0 | S2 | SS | 42.8 | 3-2-1-1 | 3 | 2.0 2.0 | | Wc = 37.1% |
| 15 | -10 | 14.0 - 16.0 Gray varved CLAY | CL | | -9.5 14.0 | ST-3 | SH | 16.9 | | | 2.0 2.0 | | Wc = 41.36%, Su = 402 psf |
| | | 16.0 - 18.0 Gray varved CLAY | CH | | -11.5 16.0 | ST-4 | SH | 2.5 | | | 2.0 2.0 | | Wc = 43.88%, LL = 53, PI = 28; Cc = 0.4, Cv = 2.2 x 10 ⁻³ cm ² /sec |
| 20 | -15 | 18.0 - 20.0 Grayish brown varved CLAY | CH | | -13.5 18.0 | S3 | SS | 9.5 | 1-1-1-1 | 2 | 2.0 2.0 | | Wc = 43.6% |
| | | 20.0 - 22.0 Gray varved CLAY | CH | | -15.5 20.0 | S4 | SS | 4.2 | 1-1-1-1 | 2 | 2.0 2.0 | | Wc = 51.50% |
| | | 22.0 - 24.0 Grayish brown varved CLAY | CH | | -17.5 22.0 | S5 | SS | 3.6 | 1-1-2-2 | 3 | 2.0 2.0 | | Wc = 50.29% |
| 25 | -20 | 24.0 - 26.0 Grayish brown varved CLAY | CH | | -19.5 24.0 | S6 | SS | 0.3 | WOH-WOH | 0 | 2.0 2.0 | | Wc = 50.79%, LL = 51, PI = 26 |
| | | 26.0 - 28.0 Grayish brown varved CLAY | CH | | -21.5 26.0 | S7 | SS | 0.4 | WOH-7-1-1 | 8 | 2.0 2.0 | | Wc = 54.6% |
| | | 28.0 - 30.0 Reddish brown varved CLAY | CH | | -23.5 28.0 | ST-5 | SH | 4.7 | | | 2.0 2.0 | | Wc = 45.69%, Su = 365 psf; Cc = 0.67, Cv = 2.5 x 10 ⁻³ cm ² /sec |
| 30 | -25 | 30.0 - 32.0 Reddish brown varved CLAY | CL | | -25.5 30.0 | S8 | SS | 0.4 | WOH-WOH | 0 | 2.0 2.0 | | Wc = 35.70%, LL = 48, PI = 24 |
| | | 32.0 - 34.0 Reddish brown varved CLAY | CH | | -27.5 32.0 | S9 | SS | 0.3 | 1-2-1-2 | 3 | 2.0 2.0 | | Wc = 53.78% |
| | | 34.0 - 36.0 Brown varved CLAY | CH | | -29.5 34.0 | S10 | SS | 0.4 | WOH-3-2-2 | 5 | 2.0 2.0 | | Wc = 53.6%, LL = 50, PI = 28 |
| 35 | -30 | 36.0 - 38.0 Reddish brown varved CLAY | CH | | -31.5 36.0 | S11 | SS | 0.2 | 1-3-3-2 | 6 | 2.0 2.0 | | Wc = 51.96% |
| | | 38.0 - 40.0 Brown CLAY with fine to coarse sand and trace fine gravel (GLACIAL TILL) | CL-SM | | -33.5 38.0 | S12 | SS | 0.2 | 8-11-15-22 | 26 | 2.0 2.0 | | Wc = 16.5% |
| 40 | -35 | Log continued on next page | | | | | | | | | | | |

AA GEOTECH LOG CARLSTADT RD BORINGS.GPJ GOLDBER NJ-PA.GDT 12/2/05

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: AmeriDrill, Inc
 DRILLER: T. Brown

GA INSPECTOR: D.Gorman
 CHECKED BY: M. McNeilly
 DATE: 10/17/05



BORING LOG

PROJECT No. 90-198-03
 BORING No. B-1
 LOGGED BY F. Gontowski
 PAGE No. 1 of 1

PROJECT NAME SCP Carlstadt Superfund Site
 BORING LOCATION (approx.) N 9476.5 E 10490.8 feet SURFACE ELEVATION 6.7 feet
 DRILLER Empire Soil Investigations DATE: START 4/15/91 FINISH 4/15/91

| DEPTH | SAMPLE | | BLOW COUNT | | | | REC (ft) | USCS SOIL TYPE | L D A E Y P E T R H | SOIL DESCRIPTION AND REMARKS | | |
|-------|--------|------|------------|-------|----|-----|----------|----------------|---------------------|---|---------------------------|------|
| | No. | TYPE | INTERVAL | | 0' | 6' | | | | | 12' | 18' |
| | | | FROM | TO | 6" | 12" | | | | | 18" | 24" |
| 5 | 1 | SS | 0.0' | 2.0' | 2 | 2 | 7 | 24 | 17 | Miscellaneous fill including interlayered and/or interbedded soil, and brick, concrete and wood fragments, dry to moist. | | |
| | 2 | SS | 2.0' | 4.0' | 22 | 20 | 25 | 8 | 18 | | | |
| | 3 | SS | 4.0' | 6.0' | 2 | 7 | 8 | 4 | 2 | | | |
| | 4 | SS | 8.0' | 8.0' | 5 | 3 | 3 | 2 | 0 | | PT | 6.0' |
| 10 | 5 | SS | 8.0' | 10.0' | 1 | 3 | 7 | 4 | 21 | USCS-Medium stiff to stiff gray silty clay with brown mottling, trace to some fine sand and trace fine root material, moist. BURMISTER- Gray CLAY & SILT, little fine Sand. | | |
| | 6 | SS | 10.0' | 12.0' | 1 | 2 | 4 | 3 | 18 | | CL-ML | |
| | 7 | SS | 12.0' | 14.0' | 4 | 6 | 7 | 10 | 24 | | 13.0' | |
| 15 | 8 | SS | 14.0' | 16.0' | 3 | 4 | 4 | 4 | 24 | USCS-Medium stiff to stiff gray silty clay with varves, slight brown mottling, trace fine sand and intermittent laminations, moist. BURMISTER-Gray CLAY & SILT, trace fine Sand. | | |
| | 9 | ST | 16.0' | 18.0' | | | | | 24 | | 18.0' | |
| 20 | 10 | SS | 18.0' | 20.0' | 1 | 1 | 1 | 1 | 24 | USCS-Very soft to medium stiff gray and reddish gray silty clay with fine sand and intermittent varves, moist to wet. BURMISTER- Gray Medium to High Plasticity Silty CLAY, trace fine Sand. | | |
| | 11 | SS | 20.0' | 22.0' | 1 | 1 | 1 | 1 | 24 | | CH | |
| | 12 | SS | 22.0' | 24.0' | 1 | 1 | 1 | 1 | 18 | | | |
| 25 | 13 | SS | 24.0' | 26.0' | 1 | 0 | 1 | 0 | 24 | USCS- Very soft reddish brown clay with trace fine sand. BURMISTER- Redish brown Very High Plasticity CLAY, trace fine Sand. | | |
| | 14 | SS | 26.0' | 28.0' | 1 | 0 | 1 | 0 | 24 | | | |
| | 15 | SS | 28.0' | 30.0' | 1 | 0 | 0 | 1 | 24 | | | |
| 30 | 16 | SS | 30.0' | 32.0' | 1 | 0 | 1 | 0 | 24 | | | |
| | 17 | SS | 32.0' | 34.0' | 1 | 0 | 1 | 0 | 24 | | | |
| | | | | | | | | | | | | |
| 35 | | | | | | | | | | | Bottom of Boring at 34.0' | |
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NOTES:
 1. Wet on spoon at 6.0'
 2. Augers dry at completion of boring.
 3. Tremie grouted boring with cement/bentonite grout at completion.

BORING LOG

PROJECT No. 90-198-03
 BORING No. B-14
 LOGGED BY F. Gontowski
 PAGE No. 1 of 1

PROJECT NAME SCP Carstadt Superfund Site
 BORING LOCATION (approx.) N 10006.6 E 10440.9 feet SURFACE ELEVATION 6.6 feet
 DRILLER Empire Soil Investigations DATE: START 4/12/91 FINISH 4/12/91

| DEPTH | SAMPLE | | BLOW COUNT | | | | REC (ft) | USCS SOIL TYPE | L D A E Y P E T R H | SOIL DESCRIPTION AND REMARKS | | |
|-------|--------|------|---------------|-------|----|----|----------|----------------|---------------------|---|-------|--|
| | No. | TYPE | INTERVAL FROM | TO | 0' | 6' | | | | | 12' | 18' |
| 5 | 1 | SS | 0.0' | 2.0' | 7 | 33 | 24 | 35 | 14 | Miscellaneous fill including interlayered and/or intermixed soil, cinders, and brick, concrete and wood fragments; dry to wet to 4.0'; wet with oily substance from 4-8.0'. | | |
| | 2 | SS | 2.0' | 4.0' | 28 | 7 | 9 | 8 | 10 | | | |
| | 3 | SS | 4.0' | 6.0' | 3 | 3 | 4 | 5 | 7 | | | |
| | 4 | SS | 6.0' | 8.0' | 5 | 1 | 1 | 1 | 14 | | | |
| 10 | | | | | | | | | | 7.1' | | |
| | 5 | SS | 8.0' | 10.0' | 3 | 2 | 4 | 4 | 8 | PT | 9.6' | USCS-Black and brown highly fibrous peat and silt with trace to some fine micaceous sand, moist. BURMISTER-Peat. |
| | 6 | SS | 10.0' | 12.0' | 3 | 8 | 26 | 14 | 12 | SM | 11.5' | USCS-Light brown fine to medium sand, moist. BURMISTER-Brown medium to fine SAND. |
| 15 | | | | | | | | | | ML-CL | 12.0' | |
| | 7 | SS | 12.0' | 14.0' | 3 | 4 | 4 | 4 | 20 | CH | | USCS-Black and dark gray fine sand and silt with trace to some organics and root material, moist to wet. BURMISTER-Gray fine SAND, some Clay & SILT. |
| | 8 | ST | 14.0' | 16.0' | | | | | 12 | | 15.0' | USCS-Gray clayey silt with brown mottling and trace fine sand, moist. BURMISTER-Gray SILT & CLAY, trace fine Sand. |
| | 9 | SS | 16.0' | 18.0' | 2 | 2 | 2 | 1 | 24 | CL-ML | | USCS-Soft light red and gray silty clay with trace fine sand and intermittent varves, moist. BURMISTER-Red High Plasticity Silty CLAY, trace fine Sand. |
| 20 | 10 | SS | 18.0' | 20.0' | WR | 1 | 1 | 1 | 24 | | | |
| | 11 | SS | 20.0' | 22.0' | WH | 0 | 1 | 1 | 24 | | | |
| | 12 | SS | 22.0' | 24.0' | 1 | 2 | 4 | 3 | 16 | | | |
| 25 | | | | | | | | | | CL-ML | 23.1' | USCS-Very soft to soft reddish brown massive silty clay with trace fine sand, moist to wet. BURMISTER-Red High Plasticity Silty CLAY, trace fine Sand. |
| | 13 | SS | 24.0' | 26.0' | 3 | 2 | 2 | 2 | 24 | | | |
| 30 | 14 | SS | 26.0' | 28.0' | 1 | 1 | 2 | 2 | 24 | | | USCS-Soft reddish brown silty clay with trace to some fine to medium sand, moist to wet (TII). BURMISTER-Red High Plasticity Silty CLAY, little fine Sand. |
| | | | | | | | | | | | | Bottom of Boring at 28.0' |
| 35 | | | | | | | | | | | | |
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- NOTES:
1. Wet on spoon at 4.0'.
 2. Augers dry at completion of boring.
 3. Tremie grouted boring with cement/bentonite grout at completion.
 4. HNu responses in drillers breathing zone ranged from 1 - 2.5ppm above background.
 5. HNu responses from drill cuttings peaked at 70ppm above background during drilling between 12 - 26'.

BORING LOG

PROJECT No. 90-198-03
 BORING No. B-16
 LOGGED BY F. Gortowski
 PAGE No. 1 of 1

PROJECT NAME SCP Carlstadt Superfund Site
 BORING LOCATION (approx.) N 9797.0 E 10482.4 feet SURFACE ELEVATION 6.0 feet
 DRILLER Empire Soil Investigations DATE: START 4/18/91 FINISH 4/18/91

| DEPTH | SAMPLE | | BLOW COUNT | | | | REC (ft) | USCS SOL TYPE | L D A E Y P E T R H | SOIL DESCRIPTION AND REMARKS | | |
|-------|--------|------|------------|-------|----|-------|----------|---------------|---------------------|--|--|-----|
| | No. | TYPE | INTERVAL | | 0' | 6' | | | | | 12' | 18' |
| | | | FROM | TO | 6" | 12" | | | | | 18" | 24" |
| 5 | 1 | SS | 0.0' | 2.0' | 10 | 100/6 | | | | Miscellaneous fill including intermixed and/or interlayered soil, cinders, and brick and concrete block fragments, dry to moist. | | |
| | 2 | SS | 2.0' | 4.0' | 11 | 8 | 30 | 11 | | | | |
| | 3 | SS | 4.0' | 6.0' | 4 | 4 | 4 | 4 | | | | |
| | 4 | SS | 6.0' | 8.0' | 8 | 1 | 0 | 1 | 8.5' | | | |
| 10 | 5 | SS | 8.0' | 10.0' | 1 | 1 | 1 | 6 | 21 | PT | USCS-Dark gray peat and silt with some fine sand, saturated with oily substance. BURMISTER-Peat. | |
| | 6 | SS | 10.0' | 12.0' | 3 | 2 | 5 | 5 | 12 | ML-CL | USCS-Stiff gray clayey silt with brown mottling and trace fine sand, moist. BURMISTER-Gray SILT & CLAY, trace fine Sand. | |
| 15 | 7 | SS | 12.0' | 14.0' | 4 | 5 | 5 | 7 | 20 | CL-ML | USCS-Stiff red, gray and brown silty clay with varves and intermittent laminations, moist. BURMISTER-Gray Medium to High Plasticity Silty CLAY. Bottom of Boring at 14.0'. | |
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- NOTES:
1. Wet on spoon at 4.0'.
 2. Water level at 11.2' in augers at completion.
 3. Tremie grouted boring with cement/bentonite grout at completion.
 4. Non-sustained HNu responses in drillers breathing zone (4 - 6') ranged from 2 - 20ppm above background.
 5. HNu responses from drill cuttings peaked at 70ppm above background during drilling between 8 - 10'.
 6. Allowed augers to aerate prior to decon.

A. SANITARY SEWER
MENT AS PER BOOK
PG. 71

S.P. STA. 5+84
HEADWALL
N 10,038
E 10,450 B' INLET

UTILITY
BOX

N 10,008
E 10,389

A. 14+00
9,995
10,435

SHEET PILE WALL
ALIGNMENT

3.3' HIGH
CONCRETE WALL

H-PILE
SUPPORTS

N 9,855
E 10,477

S.P. STA. 4+00

N 9,849
E 10,488

DATION
LY
(GRADE)

STA. 16+00

H-PILE
SUPPORTS

B-16

SLAB

TANK

N 9,704
E 10,522
3' HIGH
CONCRETE WALL

N 9,700
E 10,539

B-17

S.P. STA. 2+00

N 9,648
E 10,522

N 9,649
E 10,536

STA. 18+00

H-PILE
SUPPORTS

N 9,561
E 10,501

B-18

N 9,586
E 10,513

STA. 19+50
STA. 0+00

N 9,479
E 10,470

N 9,499
E 10,512

S.P. STA. 0+00

N 9,468
E 10,517

Scale
1"=40'

BEACH

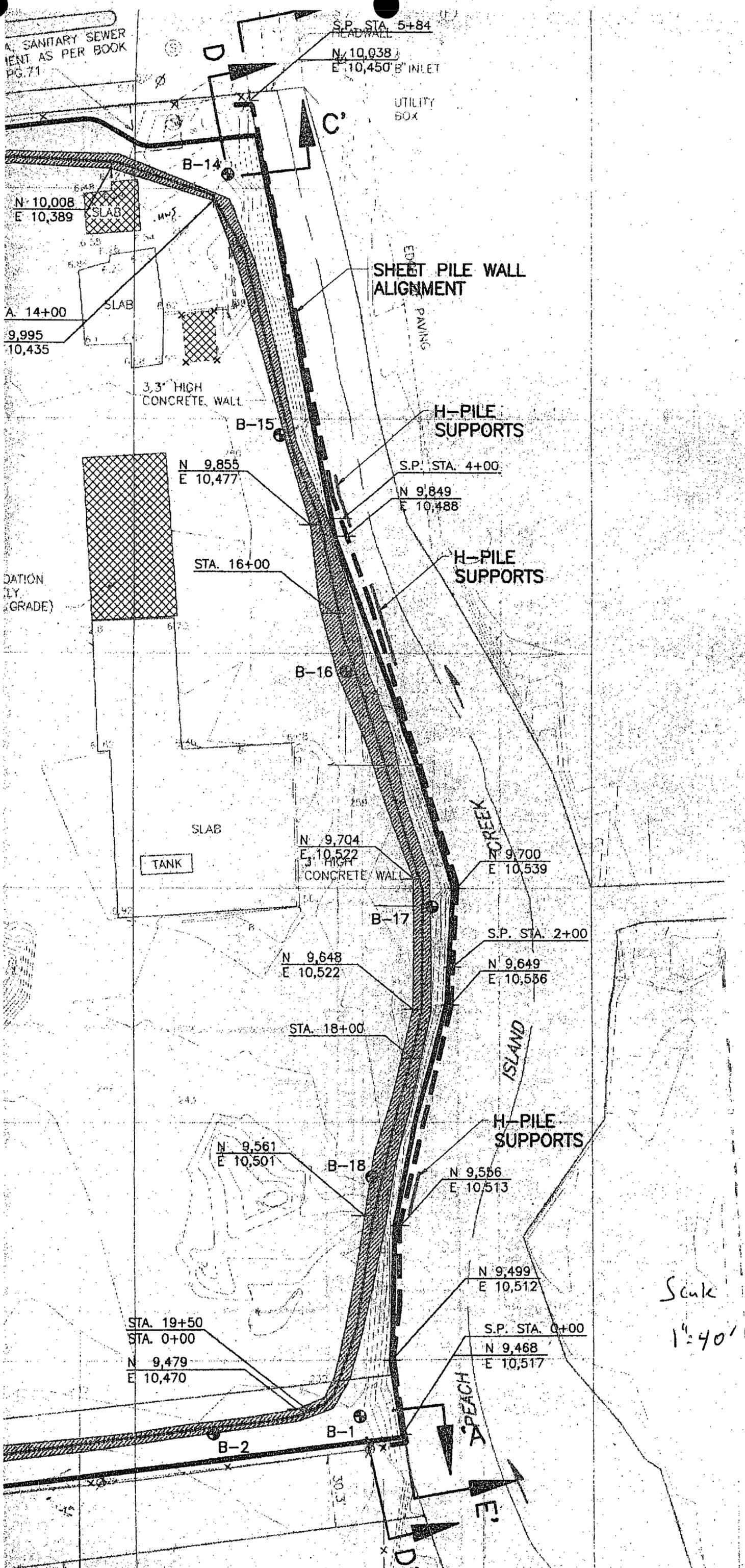
B-1

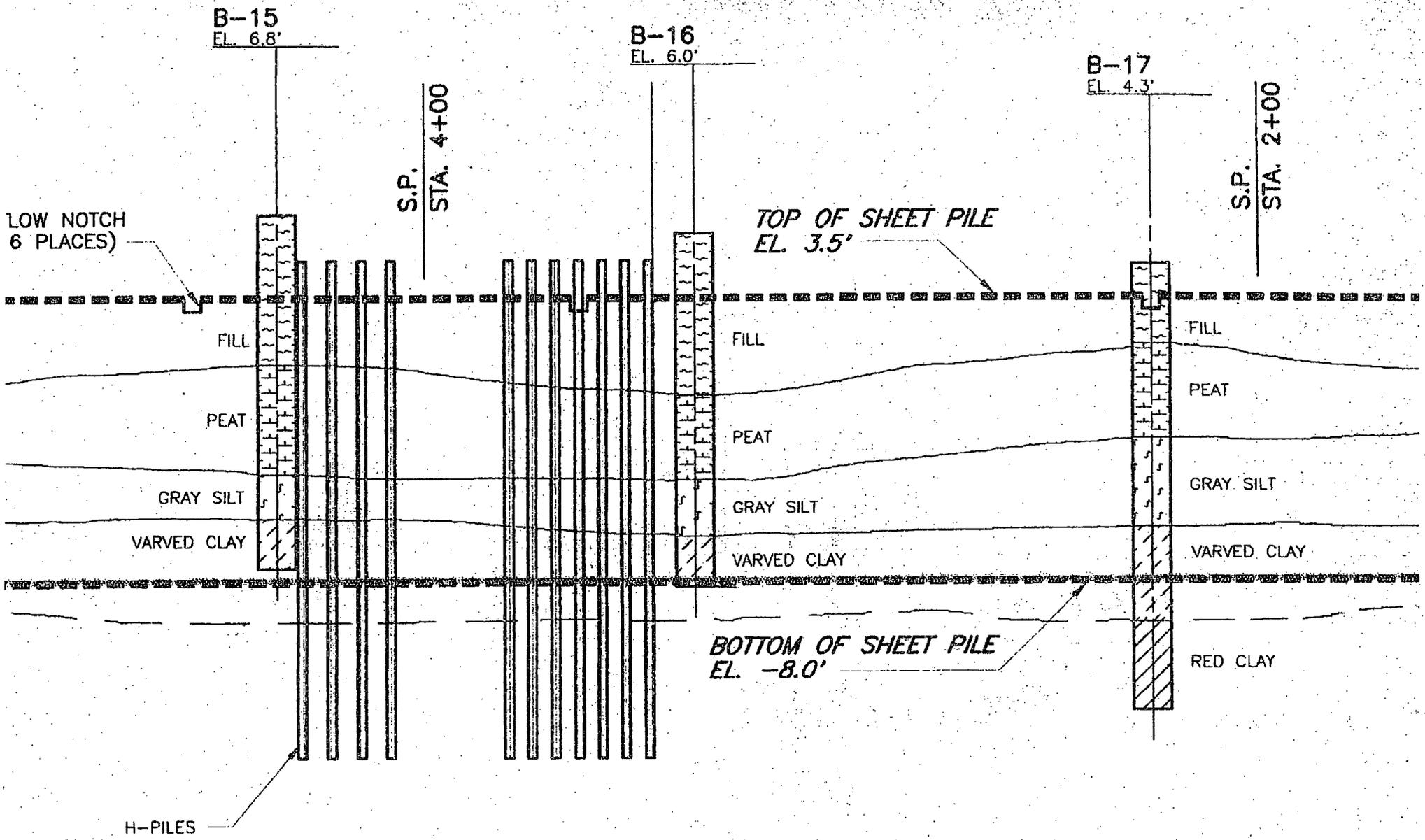
B-2

30.3

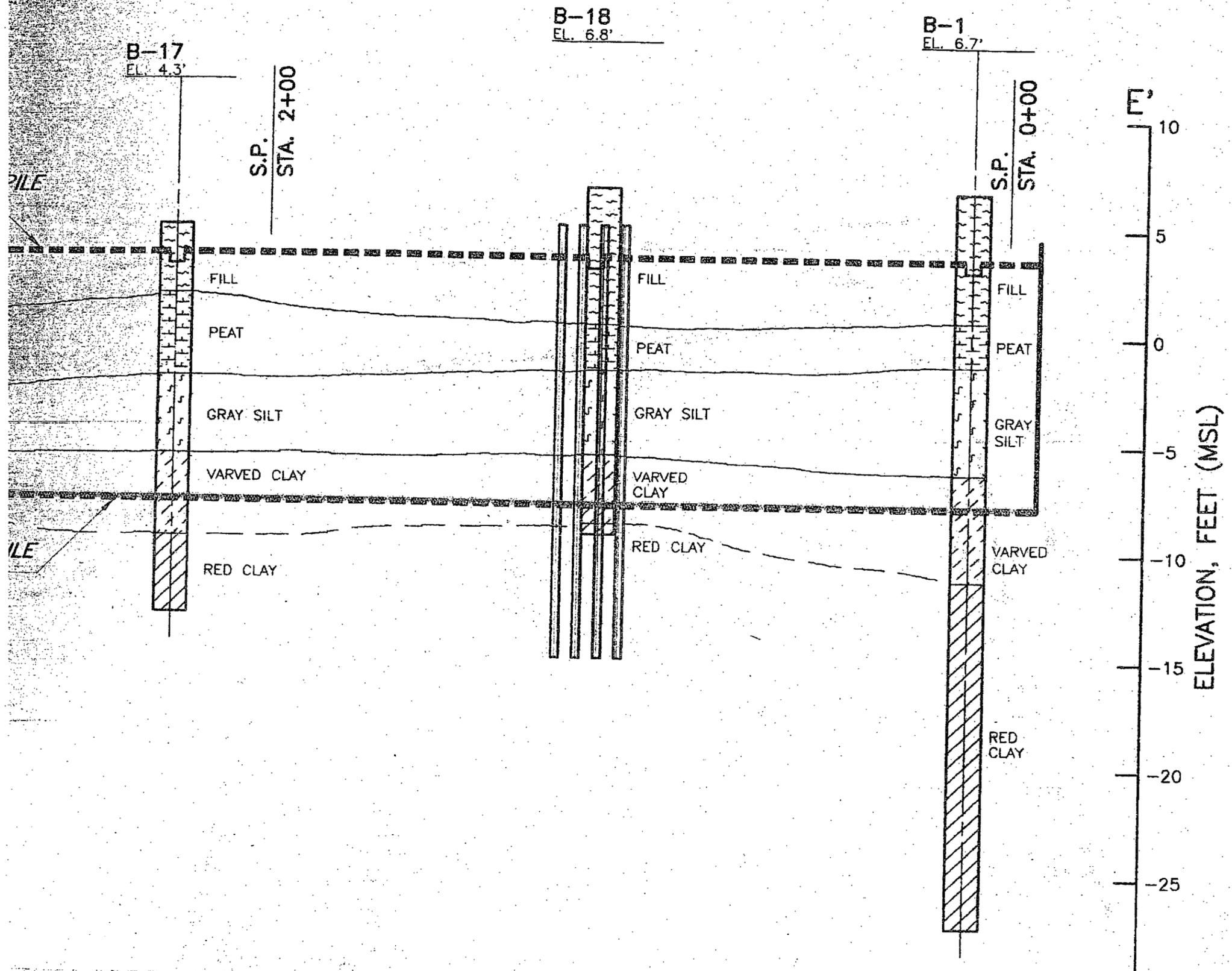
E'

D'





Horizontal Scale 1"=30'



IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

UNITED STATES OF AMERICA,

Plaintiff,

v.

Civil Action No. _____

CONSENT DECREE

3M COMPANY,
AIR PRODUCTS AND CHEMICALS, INC.,
AKZO NOBEL COATINGS, INC.,
ALTJE, INC.,
AMERICAN CYANAMID - LEDERLE LABS -
SHULTON, INC.,
AMERICAN STANDARD COMPANIES,
ASHLAND INC.,
ATOFINA CHEMICALS, INC.,
BASF CORPORATION,
BAYER CHEMICALS CORPORATION,
BEE CHEMICAL COMPANY,
BENJAMIN MOORE & CO.,
BER MAR MANUFACTURING CORP.,
BORDEN CHEMICAL, INC.,
BRISTOL-MYERS SQUIBB COMPANY,
BROWNING-FERRIS INDUSTRIES OF NEW
JERSEY,
CHEMCOAT INC.,
CHEMICAL POLLUTION CONTROL, INC. OF
NY,
CIBA SPECIALTY CHEMICALS
CORPORATION,
CNA HOLDINGS, INC.,
CONGOLEUM CORPORATION,
CROWN BEVERAGE PACKAGING
COMPANY, INC.,
CYCLE CHEM, INC.,
DRI PRINT FOILS, INC.,
DUPONT COMPANY,
EXXON MOBIL CORPORATION,
EXXONMOBIL OIL CORPORATION,
GENERAL ELECTRIC COMPANY,
GENERAL MOTORS CORPORATION,

HOFFMANN-LA ROCHE, INC.,)
HONEYWELL INTERNATIONAL, INC.,)
ISP ENVIRONMENTAL SERVICES INC.,)
JOHN L. ARMITAGE & CO.,)
JOHNSON & JOHNSON,)
KIRKER ENTERPRISES, INC.,)
L.E. CARPENTER & COMPANY,)
LUCENT TECHNOLOGIES INC.,)
MACK TRUCKS, INC.,)
MAGID CORP.,)
MALLINCKRODT BAKER, INC.,)
MANOR CARE OF AMERICA, INC.,)
MANOR CARE HEALTH SERVICES, INC.,)
MARISOL, INC.,)
MERCK & CO., INC.,)
MONROE CHEMICAL, INC.,)
NEPERA, INC.,)
NEW ENGLAND LAMINATES CO., INC.,)
NORTHROP GRUMMAN SYSTEMS)
CORPORATION,)
OCCIDENTAL CHEMICAL CORPORATION,)
PAXAR CORPORATION,)
PERMACEL, INC.,)
PFIZER INC.,)
PHARMACIA CORPORATION,)
PORTFOLIO ONE, INC.,)
REVLON CONSUMER PRODUCTS)
CORPORATION,)
ROCHE VITAMINS INC.,)
ROHM AND HAAS COMPANY,)
SCHENECTADY INTERNATIONAL, INC.,)
SEAGRAVE COATINGS CORP. (NJ),)
SIEGFRIED (USA), INC.,)
SIMON WRECKING COMPANY, INC.,)
SMITHKLINE BEECHAM CORPORATION,)
TECHNICAL COATINGS CO.,)
THE CONTINENTAL GROUP, INC.,)
THE DOW CHEMICAL COMPANY,)
THE WARNER LAMBERT CO., LLC,)
UNION CARBIDE CORPORATION,)
UNITED TECHNOLOGIES CORPORATION,)
VIACOM INC.,)

Defendants.)

CONTRACT DOCUMENT ADDENDUM NO. 3

Golder Associates Inc.

The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Telephone (973) 645-1922
Fax (973) 645-1588
www.golder.com



943-6222

ADDENDUM NO. 3

To: K. Sullivan (Code), T. Raap (ENTACT), M. Cody (ECOR), M. Hadar (RECON),
K. Corradino (Compass)

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 3**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Thursday, October 4, 2007

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 3 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

- a) The **Bid Due date** of Wednesday, October 10, 2007 at 5:00 p.m. (EST) **remains unchanged.**
- b) Replace Section 02225 "Vegetative Support Layer", revision 0, in its entirety with the attached revised Section 02225 "Vegetative Support Layer", revision 1.
- c) Incorporate answers to questions raised by the prospective Bidders.

BIDDER QUESTIONS AND ANSWERS

The following are questions raised by the prospective Bidders, as of September 28, 2007, and responses to these questions are as follows (for continuity purposes questions are numbered and re-printed herein in ***Bold Italics*** with the corresponding response directly following each question):

Q21. "Can you provide information regarding the nature and characteristics of the hot spot material to be treated (e.g., is it sludge or soil, is there a soil type classification, etc.)?"

Response #21: See attached for a copy of the November 21, 1997 Focused Feasibility Study Investigation Report.

Q22. *“Page 02450-2 of the Specifications states that the ISS mix design shall be consistent with that presented in the FFS Report for OU-2, dated April 2001. What was the mix design in that report?”*

Response #22: See attached for a copy of the April 26, 2001 Focused Feasibility Study Report.

Q23. *“One of the criteria for treatment of the hot spot is reducing leachability by 90% as compared to the FFS results. However, we do not have the FFS results. Preferably, can a numerical value be provided to represent the baseline leachability? Otherwise, can the FFS report be provided?”*

Response #23: See attached for a copy of the April 26, 2001 Focused Feasibility Study Report.

Q24. *“Does the hot spot material that may have to be disposed under Bid Item 16A carry any listed waste codes (e.g., RCRA “F” or “K” wastes related to the process from which it was generated)? Is there a specific waste classification code assigned to this material? Would the material have to be disposed as a RCRA waste, TSCA waste, or RCRA/TSCA waste? Otherwise, is there any analytical data available to aid us in assessing the waste classification requirements?”*

Response #24: Based on available information/data, Golder is not aware of any “listed” waste codes associated with the “hot spot” sludge materials. For bidding purposes, Bidders shall assume the existing “hot spot” sludge materials do not include any “listed” wastes.

To date, waste classification codes have not yet been established for these “hot spot” sludge materials. Hence, the selected Remedial Contractor shall be responsible for establishing all appropriate waste classification codes, based on the characteristics of and analytical testing performed on post-ISS (i.e., treated) materials.

Furthermore, Bidders are hereby notified that Bid Item No. 16-A, “In-Situ “Hot Spot” Treatment Production Operations (with Off-Site Disposal)”, shall include all excavation, testing, characterization, and disposal costs in connection with removal and off-Site disposal post-ISS treated materials.

For available analytical data, see attached for copies of the November 21, 1997 Focused Feasibility Study Investigation and April 26, 2001 Focused Feasibility Study Reports.

Q25. *“Is there data available regarding the hot spot area that would indicate the types and concentrations of various contaminants so we can assess the baseline for treatment?”*

Response #25: See attached for copies of the November 21, 1997 Focused Feasibility Study Investigation and April 26, 2001 Focused Feasibility Study Reports.

Q26. *“Since a major component of the cost will be an outside cost for transportation and disposal, can the units for Bid Item 16-A be converted to a per ton basis and the quantity adjusted accordingly?”*

Response #26: Yes. If Bidders elect to convert the specified "units" of Bid Item No. 16-A from "per Cubic-Yard" to "per Ton", they shall provide its assumed conversion factor in Exhibit "F" to the Bid Forms.

Q27. *"Per Page 01025-12 of the Specifications, if imported material must be provided as part of the grading fill task, payment will be under the appropriate bid item. However, the Contractor cannot quantify this material at this time. Therefore, can a unit price be added on a per ton basis to be compensated for any imported material as-needed?"*

Response #27: No. Bid Item No. 9 involves all Site grading/re-grading operations and the import of additional grading fill to attain the specified new cover system subgrade elevations, as define by the Contract Documents. Furthermore, Section 01025 of the Specifications stipulates that Bid Item No. 9 will be based on actual in-place, compacted volumes.

Q28. *"Is it expected that a security guard service will be necessary for this work? Did the prior remedial construction work at the site use security guard service?"*

Response #28: Per Specification Section 01540, the selected Remedial Contractor shall be responsible for providing and maintaining all job Site security. Furthermore, the Bidders shall be responsible for defining what it deems necessary to secure the Site for the duration of construction.

Q29. *"Page 02225-1 of the Specifications mentions that a portion of the vegetative support layer may be available from on-site and off-site sources provided by the Group. Can the quantities provided by the Group from each on-site and off-site sources be provided to serve as a basis of bid?"*

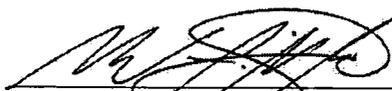
Response #29: See attached revised Specification Section 02225.

Q30. Paraphrased Question: *"Will the Group consider removing its performance and payment bonding requirements?"*

Response #30: No. The Group will not remove its performance/payment bonding requirements, and any submitted Bids that do not include costs for the specified performance/payment bonds will be deemed incomplete.

If anyone has any questions or requires additional information, please feel free to contact the undersigned at (973) 645-1922 (ext. 31303).

PREPARED BY:



Mark F. McNeilly, P.E.
Practice Leader and Associate

SECTION 02225

VEGETATIVE SUPPORT LAYER

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. CONTRACTOR shall furnish all labor, materials, equipment, tools and appurtenances required to complete portions of the Work requiring the placement of a vegetative support layer. The work of this Section includes the acquisition, placement, and grading of the vegetative layer material, material handling, and other related and incidental work within the designated areas and as required for the construction of other work, as shown, specified, or required by the Contract Documents.
- B. CONTRACTOR shall comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, State, and Federal authorities having jurisdiction. CONTRACTOR shall provide a “Competent Person” to implement, supervise, and inspect the Work.
- C. CONTRACTOR shall be responsible for procuring off-Site borrow sources for vegetative support layer material needed for construction of the specified cover system.

1.02 RELATED SECTIONS

- A. 01050 – Field Engineering/Surveying
- B. 02100 – Site Preparation
- C. 02125 – Erosion and Sediment Control
- D. 02210 – Site Grading
- E. 02223 – Backfill and Fill
- F. 02224 – Cover Soil

1.03 DEFINITIONS

- A. Vegetative support layer is defined as the uppermost 6-inch-thick soil layer component of the landfill cap, and shall be capable of supporting vegetation.

1.04 PROTECTION OF PEOPLE AND PROPERTY

- A. CONTRACTOR shall plan and execute the Work to prevent damage to the underlying geosynthetic components of the landfill cap system. CONTRACTOR shall protect existing structures, safeguard people and property, minimize traffic inconvenience, protect structures to be installed, and provide safe working conditions.

- B. Work shall be performed in accordance with all applicable health and safety and OSHA regulations, and in accordance with CONTRACTOR's Site-specific Health and Safety Plan.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Soil material used as the vegetative layer shall be loam, clayey loam, silty loam, loamy sand, sandy loam, or sandy clay loam as defined by the U.S. Department of Agriculture textural classification chart, and shall be suitable to support vegetative growth.
- B. All imported fill materials shall be obtained from off-Site deposits of natural geologic materials. Recycled and/or reprocessed materials shall not be used on-Site. In addition, mixtures of recycled/reprocessed and natural materials shall not be use on-Site. Specifically, recycled/reprocessed materials shall include, but not be limited to, recycled concrete and bituminous concrete materials.
- C. The vegetative layer shall not contain stones, lumps, roots, or similar objects larger than two (2) inches in any dimension. Vegetative layer shall not contain shells.
- D. The vegetative layer shall have a pH between 5.8 and 7.6. In addition, a Synthetic Precipitation Leaching Procedure (SPLP) test shall be run on the fill materials prior to use on-site. The SPLP will be run using a solution with pH of 4.5. The pH of the resulting leachate will be tested to verify the pH is within the range of 4.5 to 8.5.
- E. Provide a material for the vegetative layer that has a minimum organic content of 2.75 percent by weight, and a maximum organic content of seven (7) percent by weight.
- F. Soil material used as the vegetative layer must be capable of sustaining vegetation as specified in Section 02936 of these Specifications.
- G. Composted material from the clearing and grubbing operations of Section 02110 of the Specifications may be mixed and incorporated into the vegetative layer. The maximum size of composted fragments shall be two (2) inches.

2.02 TESTING

- A. CONTRACTOR shall, at least twenty-one (21) calendar days prior to use of proposed materials, submit to the QUALITY ASSURANCE OFFICER (QAO) for favorable review, certification that the material proposed for the vegetative

Revision 1

layer meets the requirements of Article 2.01 herein. This certification shall include the following tests for the material and the material source(s):

- | | | |
|----|-----------------|-----------------------|
| 1. | Particle Size | ASTM D422 |
| 2. | pH | ASTM D4972 |
| 3. | Organic Content | ASTM D2974 |
| 4. | Soil Fertility | Baker or LaMotte Test |

- B. The frequency of testing shall be once per every five-hundred (5,000) cubic yards of material delivered or once per each material source, whichever is greater.
- C. CONTRACTOR shall submit to the QAO certification of compliance along with a minimum of fifty (50) pounds of each proposed material from each proposed source.
- D. CONTRACTOR shall not proceed with the use of the material(s) until the USEPA, if necessary, and GROUP's REPRESENTATIVE have favorably reviewed the proposed materials.
- E. If, in the opinion of the REMEDIAL DESIGNER and/or QAO, CONTRACTOR's proposed material is unsuitable for the proposed application, CONTRACTOR shall submit the above certification for material of another type or from another source for consideration.
- F. CONTRACTOR shall certify that the off-Site material is environmentally clean, in accordance with N.J.A.C. 7:26E, and shall provide analytical test results to support this certification. The GROUP may elect to perform additional analytical testing, at its own cost, of samples obtained from CONTRACTOR's off-Site source to verify that the material is environmentally clean. CONTRACTOR shall cooperate with the GROUP in obtaining samples for this purpose. The GROUP may reject any sources proposed by CONTRACTOR based on analytical test results or past history of the source of the material.
- G. Any imported materials from off-Site borrow sources found not to be in accordance with the Specifications, or found to be contaminated, shall immediately be removed and replaced with suitable materials at CONTRACTOR's sole expense with no time extensions in the Construction Schedule granted. Costs associated with the QAO's effort to comply with the CQAP for this replacement effort shall be borne by CONTRACTOR as well.

PART 3 – EXECUTION

3.01 PRECAUTIONS

- A. Vegetative support soil shall not be placed on or using frozen materials. Previously placed soil that has become frozen shall be removed and replaced, or otherwise recompacted after thawing has occurred, as approved by the QAO.

Revision 1

- B. Vegetative support soil shall not be placed over snow, ice, standing water, or on a previous lift which is excessively moist, dry, cracked, rutted, or loose.

3.02 STORAGE

- A. Stockpile satisfactory excavated and imported materials where directed by the GROUP's REPRESENTATIVE until required for placement. Place, grade and shape stockpiles to provide proper drainage. Seal stockpiles with a smooth drum roller to avoid excessive moisture retention. Install appropriate erosion and sediment control devices around stockpiles.
- B. Locate and retain stockpiled soil materials in a location where the weight of the stockpiled materials will not create surcharge loading conditions on the edges of excavation as specified in Section 02220.

3.03 PLACEMENT

- A. The vegetative support layer shall be placed in all designated areas as shown on the Contract Drawings, in areas disturbed by construction activities, and as directed by the QAO or GROUP's REPRESENTATIVE.
- B. No vegetative layer material shall be placed until the cover soil placement (or backfill, fill, etc.) is complete and approved by the QAO.
- C. The vegetative layer shall be placed in a single lift with a final thickness of six (6) inches.
- D. CONTRACTOR shall take care to ensure that underlying soil remains intact and does not become mixed with the vegetative layer during installation.
- E. Heavy equipment and trucks shall be prohibited from traveling on the vegetative support layer except on temporary roadways which are constructed to the minimum thickness as listed below based on the ground pressure of the equipment or vehicles:

| Maximum Allowable Equipment Ground Pressure (pounds per square inch (psi)) | Minimum Thickness of Overlying Material (inches) |
|--|--|
| <5 | 12 |
| 5-10 | 18 |
| 10-20 | 24 |
| >20 | 36 |

3.04 FIELD QUALITY ASSURANCE/CONTROL

- A. The QAO shall obtain samples for laboratory testing and shall perform thickness measurements of the vegetative support as required by the CQA Plan.

Revision 1

CONTRACTOR shall cooperate with and assist the QAO with sampling and thickness measurements as required to meet the requirements of the CQA Plan. CONTRACTOR shall remediate the vegetative support layer as indicated by testing or field measurements to the satisfaction of the QAO.

- B. CONTRACTOR shall be responsible for conducting any and all quality control testing necessary for CONTRACTOR's purposes to satisfy the Contract Documents. CONTRACTOR shall ensure that materials placed do not exceed maximum thicknesses as required by the Contract Documents.

3.05 SURVEY CONTROL AND TOLERANCES

- A. Survey the limits and elevation of the top of the vegetative support layer in accordance with Section 01050 of the Technical Specifications.
- B. Construct the vegetative support layer to -0.0 to +0.2 feet of the thickness shown on the Construction Drawings.

***** END OF SECTION *****

R. White

Golder Associates Inc.

305 Fellowship Road, Suite 200
Mt. Laurel, NJ USA 08054
Tel: (609) 273-1110
Fax (609) 273-0778



**216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

**FOCUSED FEASIBILITY STUDY
INVESTIGATION REPORT**

Prepared for:

The 216 Paterson Plank Road Cooperating PRP Group

Prepared by:

Golder Associates Inc.
305 Fellowship Road, Suite 200
Mt. Laurel, New Jersey

DISTRIBUTION:

- 4 Copies - U.S. Environmental Protection Agency
- 3 Copies - NJ Department of Environmental Protection
- 1 Copy - Cooperating PRP Group Members
- 1 Copy - Common Counsel
- 2 Copies - Golder Associates Inc.

November 1997

Project No.: 943-6222

Golder Associates Inc.

305 Fellowship Road, Suite 200
Mt. Laurel, NJ USA 08054
Tel: (609) 273-1110
Fax (609) 273-0778



November 21, 1997

Project No.: 943-6222

Chief, New Jersey Compliance Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Attn.: Mr. Jon Gorin, Remedial Project Manager

RE: 216 PATERSON PLANK ROAD, CARLSTADT, NJ
FOCUSED FEASIBILITY STUDY INVESTIGATION REPORT

Gentlemen:

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), we enclose four copies of the above Report which has been prepared pursuant to the Work Plan approved by USEPA in a letter dated June 23, 1997. Three copies have also been provided to the New Jersey Department of Environmental Protection under separate cover.

As discussed, the investigation confirmed the presence of a sludge "hot spot" and the Report includes a recommendation that a treatability study, focusing on in-situ remediation technologies, be conducted on this material. The Group intends to develop a work scope for this study which will be submitted for your review in due course.

If any questions arise during your review of the enclosed report, please do not hesitate to contact me.

Very truly yours,

GOLDER ASSOCIATES INC.

A handwritten signature in black ink, appearing to read "P. Finn", with a long horizontal stroke extending to the right.

P. Stephen Finn, C.Eng.
Facility Coordinator

cc: Chief, Bureau of Federal Case Management
N.J. Department of Environmental Protection
Attn: Riché Outlaw, Case Manager

Warren L. Warren, Esq., Drinker, Biddle & Reath
Cooperating PRP Group Technical Committee

EXECUTIVE SUMMARY

This Focused Feasibility Study Investigation Report (Report) is submitted on behalf of the 216 Paterson Plank Road Cooperating PRP Group. The Report presents the methodologies used and the data collected during the investigation conducted pursuant to the Final Focused Feasibility Study Investigation Work Plan (Investigation Work Plan) for the First Operable Unit (FOU) fill at the 216 Paterson Plank Road Site (Site) in Carlstadt, New Jersey approved by USEPA on June 23, 1997.

The primary purpose of the Focused Feasibility Study Investigation (FFSI) was to gather data on the nature and extent of a potential sludge "hot-spot" area. The project objective was accomplished using a combination of geophysical survey techniques and a soil boring and sampling program. The geophysical survey was used to assess the approximate location and boundary of the potential sludge "hot-spot" area and to focus the subsequent soil boring program. The soil boring program defined the physical nature and extent of the sludge "hot-spot" area. Samples were also collected during the boring program and submitted to separate laboratories for chemical and geotechnical analyses.

The Investigation confirmed the presence of a discrete area of sludge that may be considered as a "hot-spot". In summary, the data collected indicates the following:

- The sludge "hot-spot" area as defined by its physical properties, is approximately 4,000 ft² in areal extent and consists predominately of sludge material and fine grained soil with little debris. Assuming an average thickness of 10 feet, this equates to a volume of approximately 1,480 cubic yards.
- The chemical characteristics of the sludge "hot-spot" include the highest volatile organic compounds (VOC) and polychlorinated biphenyl (PCB) concentrations detected anywhere on-Site.

Excavation of the materials within the sludge "hot-spot" area would be extremely difficult given the physical constraints (e.g., slope stability) and the chemical characteristics of the material to be excavated (e.g., extremely high levels of VOCs present in the material). As discussed in detail in the Investigation Work Plan, the implementation difficulties and risks associated with the sludge "hot-spot" excavation and handling at the Site are such that in-situ remedial alternatives warrant serious consideration in the Focused Feasibility Study.

In order to explore the feasibility of in-situ treatment options, additional treatability study work is necessary. A work plan addressing the required scope of work and number of samples that will be collected will be submitted for USEPA approval. It should be noted that the schedule outlined in the Investigation Work Plan included an optional item for treatability studies, should this be necessary based on data collected during this FFSL.

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1.0 INTRODUCTION

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder Associates) has prepared this Focused Feasibility Investigation Report (Report) for the Focused Feasibility Study Investigation (FFSI) of the First Operable Unit (FOU) fill at the 216 Paterson Plank Road Site (Site) in Carlstadt, New Jersey (Figure 1). This report presents the methodologies used and the data collected during investigations conducted pursuant to the Final Focused Feasibility Study Investigation Work Plan (Investigation Work Plan) dated May 1997 and approved on June 23, 1997. This Report is submitted in partial fulfillment of the reporting requirements set forth in the FFS Work Plan (Golder Associates, 1995). Administratively, the work is being conducted pursuant to the additional work provisions of an Administrative Order on Consent (Index No. CERCLA II-50114) dated September 30, 1985 (RI/FS Order).

1.1 Background

The 6-acre Site is a former chemical recycling and waste processing facility, which ceased operation in 1980 and was placed on USEPA's National Priorities List (NPL) in 1983. A remedial investigation was initiated in 1987 leading to a USEPA Record of Decision (ROD) in 1990. Interim Remedial Measures, pursuant to the ROD, were completed in 1992 for the FOU fill zone. A Focused Feasibility Study (FFS) was initiated at the request of USEPA to provide a basis for selection of a final remedy for the FOU. The FFS is being conducted in accordance with an approved FFS Work Plan (Golder Associates, 1995) which also addresses investigation of the deeper groundwater in the vicinity of the Site as part of a separate Off-Property Investigation.

In accordance with the FFS Work Plan, Golder Associates completed Phase I of the FFS, Development of Remedial Alternatives. On January 25, 1996, Group representatives and Golder Associates met with USEPA and presented the Phase I results that included a summary of existing data, recommended remedial alternatives for consideration in Phase II of the FFS (Detailed Evaluation of Alternatives), and data gaps required to be filled to complete the detailed evaluation.

Phase I of the FFS identified a number of severe limitations and complex issues associated with ex-situ remedial options as a result of the large amount of construction and demolition (C&D) debris contained within the FOU fill and health and safety risks to construction workers and nearby receptors. The limitations associated with ex-situ remedial alternatives for the FOU were discussed

in detail in the Investigation Work Plan which concluded that Site-wide ex-situ treatment alternatives be eliminated from further consideration in the FFS. In addition, potential "hot-spot" areas were to be considered; the FFS Work Plan defined a "hot-spot" to be:

- an area where, if the chemical constituents are removed and/or treated, the Site-wide risk would be reduced by over an order of magnitude; and,
- an area small enough to be considered separately from remediation of the entire FOU.

Phase I of the FFS identified that "sludge" in the vicinity of the RI boring B-1 potentially fits this working definition of a "hot-spot." The sludge previously observed was a fine-grained material with a grease-like consistency which offered very little penetration resistance during drilling and was relatively free of debris. The highest concentrations of PCBs on the Site and elevated VOC concentrations were also associated with this material. As a result, remediation of the sludge constituents detected in the B-1 boring would yield almost a two order of magnitude reduction of direct contact risk. It was also noted that boring B-1 was located in the eastern portion of the Site in the vicinity of two former ponds.

The USEPA requested that the Group complete a work plan to address data gaps presented at the January 25, 1996 meeting. These data gaps include:

1. further define the potential sludge "hot-spot" area in the vicinity of boring B-1;
2. verify the geotechnical properties of the soils directly underlying the FOU; and,
3. evaluate the need for possible future treatability study/pilot work on remedial technologies for the "hot-spot" area based on the results of the FFSI.

This request led to the development of the Investigation Work Plan (Golder Associates, 1997) and implementation of the FFSI work presented in this report.

1.2 Project Objective

The primary objective of the FFSI was to gather data necessary for the evaluation of remedial alternatives in a sludge "hot-spot" area. This, in turn, entails determining the nature and extent of the sludge "hot-spot" area and its chemical characteristics, together with the geotechnical properties of the natural materials underlying the sludge "hot-spot." Based on these results, the need for

treatability studies in the sludge "hot-spot" area can be evaluated. The project objective was accomplished using a combination of geophysical survey techniques and a soil boring and sampling program. The geophysical survey was used to assess the approximate location and boundary of the potential sludge "hot-spot" area and to focus the subsequent soil boring program. The soil boring program was used to define the nature and extent of the sludge "hot-spot" area. Samples were collected during the boring program and submitted to separate laboratories for chemical and geotechnical analyses.

This Report includes the following key elements:

- Section 2 describes the Investigation procedures including the surface geophysical survey and the soil boring program;
- Section 3 discusses the results of the surface geophysical survey, describes the subsurface materials encountered during the drilling program, and discusses the soil analytical and geotechnical results; and,
- Section 4 presents the conclusions and provides recommendations for future investigations at the Site.

2.0 FOCUSED FEASIBILITY STUDY INVESTIGATION FIELD WORK

2.1 Overview of the Field Investigation

The FFSI included the following:

1. Geophysical Survey: in the area of RI boring location B-1 and the two former ponds;
2. Soil Boring Program: to define characteristics (areal extent, subsurface material types, and chemical constituent concentrations) in the vicinity of the potential sludge "hot-spot" area at location B-1 and other potential sludge areas within the two former sites as identified during the geophysical survey;
3. Geotechnical Sample Collection and Analysis: to provide geotechnical parameters for the meadow mat layer and upper glaciolacustrine varved unit below the potential sludge "hot-spot" area.

Field activities commenced on July 8, 1997, with the geophysical survey, and the on-Site boring program was completed on August 18, 1997. The geophysical survey was performed by Golder Associates and drilling services were provided by Aquifer Drilling & Testing - MidAtlantic, Inc. of Trenton, New Jersey. Laboratory services were provided by CompuChem Environmental of Durham, North Carolina, Accutest of Dayton, New Jersey, Accredited Laboratories of Carteret, New Jersey, and the Golder Associates soils laboratory (geotechnical analysis) in Mt. Laurel, New Jersey. Surveying services were provided by GEOD Corporation of Newfoundland, New Jersey

2.2 Surface Geophysical Survey Program

The surface geophysical testing commenced on July 8, 1997 and was completed on July 11, 1997. Details of the procedures and results are presented in Appendix A and results are summarized in Section 3.0. Geophysics was used to assist in determining the approximate extent of areas containing sludge material and/or large debris. The data collected from the geophysical survey was then used to guide the placement of borings for the Soil Boring Program in the B-1 and former pond areas.

In accordance with approved Investigation Work Plan, the geophysical methods initially employed for the survey were electromagnetic induction (EM-31) and ground penetrating radar (GPR). The geophysical survey was carried out over an area of approximately 1.75 acres covering the northeast portion of the Site where the former ponds had been located based on aerial

photographs (see Figure 2). A grid was laid out over the survey area to provide a reference for the EM-31 readings and GPR traverses. Grid lines were laid out at 6-foot intervals and EM-31 readings were recorded at 3-foot intervals along the lines.

After starting the EM-31 survey, it became obvious that the subsurface materials were highly conductive and that there was a considerable amount of buried metal present. The lowest recorded apparent conductivities, in areas free from the influence of buried metal, were on the order of 100 to 120 milli seimens per meter (mS/m) - which is high for natural or undisturbed earth materials. Due to the high apparent conductivity of the subsurface materials, it was evident that the planned GPR survey would not be effective for profiling the former pond areas and B-1 area. GPR energy is rapidly attenuated in conductive materials and so the depth of investigation would be very limited. Preliminary field testing with the GPR confirmed a penetration depth of only 1 to 2 feet and so use of this technique was curtailed. Instead, based on the early results of the EM-31 survey, it was considered appropriate to supplement the EM-31 survey with an EM-61 survey to assist in identifying areas underlain by buried metal objects and potential sludge areas. The EM-61 instrument provides response indicative of buried metal. An EM-61 survey was therefore completed over the study area using the same measurement grid as for the EM-31 instrument.

2.3 Drilling and Sampling Program

The on-Site boring and sampling investigation commenced on August 5, 1997 and was completed on August 18, 1997. A total of seventeen boreholes (B-1 and GB-01 through GB-16) were completed and eight samples were collected for chemical analysis in accordance with Appendix C (SAMP) of the Work Plan. Figure 2 illustrates the location of the boreholes, boring logs are provided in Appendix B, and a sampling and analyses summary is presented in Table 1. The laboratory analytical results are presented in Section 3.0.

2.3.1 Health and Safety

The on-Site boring investigation followed the Health & Safety Plan provided in the Work Plan enhanced in accordance with the Addendum submitted to the USEPA on July 29, 1997. As per the Addendum, the drilling and sampling program initially began in Level D protection and was accompanied by air monitoring using the following instruments:

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- Mini-Rae Photo-ionization detector (PID) for volatile organic compound (VOC) monitoring;
 - Foxboro 128, organic vapor analyzer (OVA) which uses a flame ionization detector (FID) for VOC monitoring;
 - Jerome Mercury Analyzer for mercury monitoring; and,
 - Sensidyne pump with detector tubes for: methylene chloride, benzene, and vinyl chloride monitoring.

All instruments were calibrated, at a minimum, to the operation manual specifications prior to use each day and air monitoring was performed by an on-Site Health & Safety Officer (HSO). As a result of elevated concentrations recorded on the PID and OVA instruments within the exclusion zone (e.g., borehole and breathing zone) at the first borehole location (B-1) testing for benzene, methylene chloride, and vinyl chloride were performed. Concentrations of vinyl chloride within the breathing zone were detected above the OSHA permissible exposure limit (PEL) of 1 ppm. Consequently, the level of protection for all personnel within the exclusion zone was immediately upgraded to Level B protection and maintained at this level throughout the drilling program until August 15, 1997 when the level of protection was downgraded to Level D for the drilling crew based on the air monitoring results. The sampling crew continued in Level B protection because of their need to work in close proximity to the subsurface materials collected for logging the materials and sample preparation.

Regular monitoring of air quality outside the exclusion zone was conducted by the HSO to ensure protection of off-Site receptors.

There were no detections above background recorded on any instrument or detector tube (benzene, methylene chloride, and vinyl chloride) outside the exclusion zone. A summary of the air monitoring is provided in Appendix C.

2.3.2 Drilling Program

The drill rig, augers, rig tools, and split-spoons were thoroughly steam cleaned upon arrival on-Site and prior to leaving the Site with potable water obtained from a water main located on-Site. The augers and rig tools were also thoroughly steam cleaned between each borehole and split-spoon samplers were steamed cleaned after each use and decontaminated in accordance with the

decontamination procedures outlined in Appendix C of the Investigation Work Plan. A temporary decontamination pad was used to contain water and drill cuttings/mud generated from the steam cleaning operations. The water and drill cuttings/mud generated from the steam cleaning were placed into DOT approved 55-gallon drums and labeled and staged on-Site for subsequent disposal.

Each borehole was completed using hollow-stem auger drilling techniques and an all terrain vehicle (ATV) rig with rubber tires so as to protect the geomembrane cover. A minimum area of the geomembrane was cut at each borehole location. Each borehole was advanced with 3-1/4-inch inside diameter hollow stem augers. Soil samples were taken during drilling using a 3-inch outside diameter (OD) split-spoon sampler at continuous intervals through the fill material to the top of natural soil. Blow counts required to drive the split-spoon each 6-inch increment were recorded. The total recovery of each sample was measured and the soil classified using the Unified Soils Classification System (USCS) based on visual description. Soil samples were monitored for the presence of volatile organic compounds (VOCs) using a PID and readings were recorded on the boring log.

A total of five boreholes (B-1, GB-01, GB-02, GB-03, and GB-10) were advanced to greater depth to obtain a relatively undisturbed sample of the meadow mat layer and the upper glaciolacustrine varved unit using shelly tube samplers. Shelly tube sampling was conducted in conformance to the procedure outlined in the Investigation Work Plan.

Upon completion of each borehole, the borehole was tremie grouted with a cement/bentonite mixture to ground surface and the geomembrane was temporarily secured. The geomembrane at each boring location will be permanently repaired in accordance with the specifications outlined in the Investigation Work Plan. All drill cuttings were placed into DOT approved 55-gallon drums and labeled and staged on-Site for subsequent disposal.

2.3.3 Analytical Sampling Program

Select samples of the subsurface material were collected from 2-foot intervals and analyzed for Target Compound List and Target Analyte List constituents (TCL/TAL; minus cyanide). In addition, samples were also analyzed for pH, moisture content, grain size, total organic carbon (TOC) and oil and grease. Samples collected for the TCL volatile organic analysis were collected from a discrete 6-inch interval that was biased toward the interval of highest apparent

contamination based on air monitoring using a PID instrument. After the volatile organic sample was collected, the remaining material was placed in a decontaminated stainless steel bowl. Large debris items were removed, the sample was homogenized using a stainless steel spoon, and the remaining sample containers were filled with the homogenized soil.

Quality assurance/quality control (QA/QC) samples were collected to monitor the quality and integrity of the field and laboratory techniques. One field duplicate at location GB-04D (FGB-04D); five field rinsate blanks (RFF-01 and RFF-03 through RFF-06); and two matrix spike, matrix spike duplicates (MS/MSDs) at location B-1B and GB-04B were collected. The field rinsate blanks included one sample collected per day per equipment type.

All sampling equipment was decontaminated following the procedure set out in Appendix C of the Investigation Work Plan and samples were managed under strict chain-of-custody procedures.

2.3.4 Analytical Testing & Validation

The initial samples were analyzed for TCL and TAL (minus cyanide), TOC and oil and grease parameters by CompuChem Laboratories (sample B-1 and rinsate sample RFF-01). However, due to problems encountered with overnight courier services as a result of the UPS strike, it was necessary to secure the services of a local laboratory for analytical services during this investigation to achieve compliance with sample hold times as described in a letter to USEPA dated August 13, 1997. Accutest of Dayton, New Jersey therefore performed all analytical testing of the remaining samples with the exception of TOC analyses that were performed by Accredited Laboratories of Carterat, New Jersey. All three laboratories used are certified by the State of New Jersey for chemical testing. Moisture content, pH, grain size analysis, and unconsolidated/undrained compressive strength analysis (ASTM D2850) was performed by Golder Associates soils laboratory located in Mt. Laurel, New Jersey. The Golder Laboratory is certified by ASTM for soils testing. The laboratory testing program is summarized in Table 1.

All chemical data was validated in accordance with USEPA Region II Standard Operating Procedure. A data validation narrative is included in Appendix D.

3.0 FFS INVESTIGATION RESULTS

3.1 Surface Geophysical Survey

An interpretation can be made of the distribution of anomalous high apparent conductivity zones thought to be associated with the sludge material from the data collected with the EM-31 and EM-61 instruments. The premise of this analysis is that sludge materials form a highly conductive material which can be distinguished from buried metal by comparison of the EM-31 and EM-61 data, since the EM-61 essentially responds only to buried metal. Using this approach, two potential sludge areas (Areas 1 and 2) were identified as shown on Figure 3 together with other areas that indicate substantial buried metal and debris. Figure 3 also shows the approximate maximum limit of the two former ponds based on review of aerial photographs and the location of previous boring B-1 as presented in the Investigation Work Plan.

Details of the geophysical procedures and results are presented in Appendix A and in summary, interpretation of the geophysical survey data indicates the following:

- Two areas (Areas 1 and 2) of anomalous high apparent conductivity materials potentially associated with sludge material were identified;
- Previous boring B-1, which encountered sludge, is centrally located within Area 1; and
- A substantial proportion of Areas 1 and 2 contains buried metal and debris.

Based on this data, the following recommendations for the on-Site boring program were submitted to the USEPA in a letter dated July 31, 1997.

B-1 Area Borings

Proceed with the boring program as outlined in the Investigation Work Plan, avoiding areas that contain debris. This program included a boring at location B-1 and initially four surrounding locations (GB-01 through GB-04) on a 20-foot spacing to assess the presence of sludge. Additional borings were to be added, as necessary, to delineate the sludge within Area 1 that was relatively debris free.

Former Pond Area Borings

As per the Investigation Work Plan, anomalies of significant size identified by the geophysical survey having a signature consistent with that found in the B-1 area, were to be investigated by means of verification boring. On this basis, a verification boring (GB-05) was completed in Area 2 to provide a physical description of the material. If sludge material similar to that found in Area 1 was encountered, a sample of the material was to be collected and submitted to the laboratory for analysis. If additional borings were deemed necessary to define the extent of sludge in Area 2, the investigation was to be conducted similar to the B-1 area investigation described above.

3.2 Subsurface Investigation

The subsurface investigation interpretation presented here is predominantly based on data obtained during the FFSI but also includes data previously obtained on-Site by Dames and Moore (1989) and Canonie (1992).

3.2.1 General Succession

The types of materials encountered during the drilling program consisted of man-made fill and sludge material underlain by marine and marsh deposits. A brief description of the materials encountered is provided below, the locations of the boreholes are shown on Figure 2, and geologic cross-sections are presented as Figures 4 and 5.

Man-Made Fill Unit

The unit directly underlying the area investigated consists of miscellaneous man-made fill. The fill materials encountered have a wide range of composition and particle size consisting of construction debris, brick, asphalt, wire, concrete, wood, glass, plastic, etc. The predominant soil material in which the debris is encountered consists of a silty clay or clayey silt matrix. The variable composition of the fill results in a highly erratic response to split-spoon penetration as measured by the Standard Penetration Test (SPT) blow counts. The blow counts ranged from 6 to as much as 111, and at six locations split-spoon refusal was encountered (GB-03, GB-08, GB-12, GB-13, GB-15, and GB-16).

In addition, during the course of the drilling program, some of the SPTs did not recover any sample (B-1, GB-07, GB-08, GB-09, GB-11, and GB-12) due to large debris blocking the opening of the 3-inch OD split-spoon sampler. At four locations (GB-08, GB-11, GB-13, and GB-15), there was difficulty in advancing the hollow stem augers through the fill material due to the presence of larger debris material. At location GB-08 there was large bundle of wire wrapped around the lead auger when the augers were pulled from the borehole. These observations during the drilling program further substantiate the heterogeneity and varying quantity and sizes of materials within the fill, even in areas which were relatively debris free based on the geophysics results.

Sludge Material

Materials consisting of predominately sludge or a mixture of sludge, fill and peat materials were encountered in discrete zones ("pockets") within the fill unit. Two types of sludge materials (based on physical properties) were encountered:

- A black sludge with a grease-like consistency (similar to the material described in the borehole log for B-1 during the RI); and
- A brown sludge with fine sand.

In addition, varying quantities and sizes of glass, wood, brick and plastic debris was also present in some of the sludge material encountered. The SPT blow counts for materials containing sludge were not as variable as in the fill unit, ranging from 2 up to 26 in sandier portions or portions containing some debris. Difficulty with drilling penetration was not encountered and split-spoon sample recovery was generally good.

The particle size analysis performed on sludge/fill material indicates that they generally consist of fines, some fine sand, with trace to some fine gravel. Particle size distribution curves are included in Appendix E.

Marine and Marsh Unit

A "meadow mat" of peat, organic silt and clay intermixed with sand is the youngest natural unit underlying the Site. The peat encountered in the boreholes was predominately a fibrous organic material and was encountered in seven boreholes (GB-04, GB-05, GB-08, GB-11, GB-13, GB-15, and GB-16). Gray organic silty clay, clayey silt, and silty fine sand underlie the peat.

3.2.2 Nature and Extent of Sludge "Hot-Spot"

A total of seventeen boreholes (B-1, and GB-01 through GB-16) were completed to define the limits of the sludge "hot-spot". The drilling commenced at location B-1 (Phase I) and proceeded outward to the four surrounding locations (GB-01 through GB-04) on a 20-foot spacing. Sludge material was encountered at locations GB-02 and GB-04 and a fine grained soil material with little debris was encountered at location B-1 from 0 to 4 feet bgs. It should be noted that due to the problems encountered with an overnight shipment of samples, an additional boring was necessary to obtain replacement samples of sludge material encountered in borehole GB-02. This replacement boring, GBR-02, was completed within 2 feet from the original borehole. Borings GB-01 and GB-03 did not encounter sludge or any similar fine grained materials.

As per the Investigation Work Plan, additional borings were completed approximately 20 feet outward from GB-02 and GB-04 to assess the areal extent of the sludge material. The boring investigation proceeded in a phased manner locating each additional boring progressively further from the B-1 area so as to delineate the extent of the sludge. The area was defined based primarily on the physical characteristics of the materials (i.e., sludge or fine grained soil materials free of debris) encountered in the boreholes and secondarily the PID readings of samples. A total of 17 borings were completed and a discussion of the program and the rationale for the boring locations is provided below.

- Phase II: Defining the areal extent of the sludge west of boring GB-04. This ultimately included the completion of three additional borings, GB-06, GB-07 and GB-08. Borings GB-06 and GB-07 both encountered sludge material. Boring GB-08, the boring furthest outward (approximately 60 feet) from GB-04 did not encounter sludge or predominately fine grained soil materials thereby defining the limit of the sludge "hot-spot" area.
- Phase III: Defining the extent of the sludge material north and east of boring GB-02. This ultimately included two additional borings, GB-09 and GB-10. Sludge material or predominately fine grained materials were not encountered in either boring thereby defining the limit of the sludge "hot-spot" area north and east of boring GB-02.
- Phase IV: Defining the areal extent of sludge material to the south of borings GB-04, GB-06, and GB-07. This investigation ultimately included the completion of borings GB-11 and GB-12. Borings GB-11 and GB-12 did not encounter sludge or predominately fine grained soil material. Therefore, the extent of the sludge "hot-spot" area to the south of borings GB-04, GB-06, and GB-07 was considered completed.
- Phase V: Defining the areal extent of sludge material to the north of borings GB-04, GB-06, and GB-07. This involved completion of borings GB-13 and GB-14 both of

which encountered sludge material. Additional borings to the north of GB-14 were not completed because of its close proximity to the edge of the slurry wall. Borings GB-15 and GB-16 were drilled to the north and west of boring GB-13. Sludge or predominately fine grained soil material was not encountered in either boring thereby defining the limit of the sludge "hot-spot" area.

The remaining part of the investigation included the completion of boring GB-05, which was located in the area identified as Area 2 from the geophysical survey. This boring did not encounter any sludge or predominately fine-grained material. Additionally, the PID readings from the soil samples obtained from the split-spoon sampler were generally non-detect. Therefore, based on the physical characteristics and PID readings this area was not considered a potential sludge "hot-spot" area. As such, additional borings were not completed nor were samples submitted for chemical analysis as per the Investigation Work Plan.

Based on the data collected from the boreholes geologic cross-sections are provided as Figures 4 and 5 and the estimated areal extent of the sludge "hot-spot" area is shown on Figure 6. The data collected from the boreholes generally agrees with the interpreted results from the geophysical survey. However, the actual area containing sludge material is not as extensive as the potential area interpreted from the geophysical survey results. Boring investigation of the western portion of Area 1 was limited due to the presence of large buried debris as indicated by the geophysics and confirmed by the RI data from Test Pit TP-15 and piezometer P-4. TP-15 and P-4 also did not encounter sludge material or elevated PID readings.

A total of eight samples representing the sludge "hot-spot" area (six samples of sludge and two samples of fine grained soil material) were submitted for analysis (refer to Table 1). As per the Investigation Work Plan, sludge-like material encountered in borings B-1 and GB-01 through GB-04 was sampled and submitted for analysis. Additionally, where greater than four feet of sludge/fine grained material was encountered (as at GBR-02 and GB-04), then two samples from each boring were submitted for analysis. In accordance with the Investigation Work Plan, additional borings completed beyond 40 feet from B-1, as necessary to continue define the limits of the sludge "hot-spot", were only used for defining the physical characteristics of subsurface materials.

Boring B-1 did not encounter sludge material. However, the first four feet of the materials encountered consisted predominately of silty clay with very little debris. A sample having the

highest recorded PID reading representing the 2-4-foot interval (B-1B) was submitted for analysis. Sludge samples submitted from boreholes GB-06, GB-07, and GB-14 were also submitted for analysis.

3.3 Testing

3.3.1 Chemical Testing

The analytical chemistry data from this investigation is presented in full in Appendix E and a summary of the detections is provided in Table 2. The data is also compared to the USEPA Initial Preliminary Remediation Goals for the Site (PRGs; USEPA letter dated November 19, 1993) for those constituents for which an initial PRG value is available.

Remedial Investigation Analytical Results

During the remedial investigation, 34 soil samples were collected within the FOU fill from 17 boring locations (Dames and Moore, 1990). Boring locations were biased toward potential source areas as identified in aerial photographs and former operation areas. Samples were collected from each boring at two intervals: 0 to 2 feet (surface) and 5 to 6 feet (subsurface). The samples were analyzed for priority pollutant VOCs, SVOCs, pesticides, PCBs, and metals.

A number of chemical constituents were detected, primarily VOCs, SVOCs (generally polynuclear aromatic hydrocarbons or PAHs), three pesticides, PCBs, and metals. Most constituent detections were less than the PRGs. Compounds detected in the RI boring B-1 which exceeded the initial PRGs comprise tetrachloroethene, trichloroethene, PCBs (aroclor-1242), arsenic, and lead. Boring B-1 exhibited the highest concentrations of VOCs and PCBs encountered on the Site.

FFSI Analytical Results

Volatile Organic Compounds

A total of sixteen VOC compounds were detected. The most prevalent VOCs (detected in more than half the samples) comprise benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, methylene chloride, 4-methyl-2-pentanone (MIBK), tetrachloroethene (PCE), trichloroethene (TCE), toluene, and total xylenes. Total VOC concentrations ranged from 1,765 mg/kg (GB-14C) to 36,320 mg/kg (GB-07F) with the highest VOC concentrations detected in samples GB-04B, GB-04D, GB-06D, and GB-07F.

A total of four compounds were detected at concentrations above the initial PRGs. 1,2-dichloroethane (PRG 62 mg/kg) was detected in one of the eight samples (GB-07F) at a concentration of 340 mg/kg. Vinyl chloride (PRG 3 mg/kg) was detected in two of the eight samples at concentrations of 58 mg/kg (GBR-02C) and 44 mg/kg (GB-14C). TCE was detected in all eight samples and exceeded the initial PRG value of 520 mg/kg in six of the eight samples. Concentrations of TCE ranged from 99 mg/kg (GB-14C) to 8,900 mg/kg (GB-07F). PCE was detected in all eight samples at concentrations above the initial PRG value of 110 mg/kg. Concentrations of PCE ranged from 370 mg/kg (GB-14) to 8,900 mg/kg (GB-07F).

In general, the constituents detected in the FFSI samples are consistent with the RI analytical data for boring B-1. However, the total VOC concentrations detected in RI boring B-1 were generally lower. Total VOC concentrations detected in Boring B-1 during the RI were 12,167 mg/kg for the surface sample (0-2 feet) and 6,502 mg/kg for the subsurface sample (5-6 feet). The next highest concentration of total VOCs detected on-Site during the RI was 9,900 mg/kg (subsurface) at location MW-7D.

Semi-Volatile Organic Compounds

A total of thirty-four SVOC compounds were detected, of which nineteen were detected in more than half of the samples. Compounds which were detected in all eight samples, include phenol, 1,2-dichlorobenzene, 4-methylphenol, naphthalene, 2-methylnaphthalene, and bis(2-ethylhexyl)phthalate.

Total SVOC concentrations ranged from 15 mg/kg (B-1B) to 1,327 mg/kg (GB-07F) with the highest SVOC concentrations detected in samples GB-04B, GB-06D, and GB-07F.

Three compounds were detected at concentrations above the initial PRGs. Benzo(a)pyrene (1.2 mg/kg), and dibenz (a,h)anthracene (1.1 mg/kg) were each detected in one sample (GBR-02B) above the initial PRG value of 0.78 mg/kg. Bis(2-ethylhexyl)phthalate was detected in three of the eight samples (GB-04B, GB-06D, and GB-07F) at concentrations above the initial PRG value of 400 mg/kg.

In general, there were fewer SVOC constituents detected during the RI. The total SVOC concentrations detected in the RI boring B-1 was 505 mg/kg (surface) and 1,078 mg/kg

(subsurface). The highest concentration of total SVOCs detected on-Site during the RI was 3,913 mg/kg (subsurface) at location B-3.

Pesticide/PCBs

A total of three pesticide compounds were detected. Endrine ketone was detected at a concentration of 12 mg/kg in sample FGB-04D (field duplicate for GB-04D). There is no initial PRG value available for this compound. Aldrin (1.6 mg/kg) and dieldrin (0.86 mg/kg) were detected in only one sample (B-1B) above the initial PRGs of 0.34 mg/kg and 0.36 mg/kg, respectively.

Aldrin (4 samples), dieldrin (10 samples), and methoxychlor (1 sample) were detected during the RI. The highest concentrations detected in the RI were 57 mg/kg for aldrin and dieldrin at location B-6 and 150 mg/kg for methoxychlor at location B-4.

Aroclor-1242 was detected in all FFSI samples at concentrations ranging from 49 mg/kg (B-1B) to 1,400 mg/kg (GB-06D) which exceed the upper initial PRG value of 25 mg/kg. The highest concentrations of PCBs were detected in samples GB-04B, GB-04D, GB-06D, and GB-07F. As previously discussed, the RI boring B-1 encountered at 15,000 mg/kg (0 to 2 feet) and 210 mg/kg (5-6 feet).

Inorganics

TAL inorganics were detected in all of the FFSI samples with beryllium, lead, and arsenic at concentrations exceeding the initial PRG values. Beryllium (PRG 1.34 mg/kg) was detected at a concentration of 1.80 mg/kg and 2.50 mg/kg in samples GB-4B and GB-14C, respectively. Lead was detected at concentrations of 947 mg/kg (GB-4B), 999 mg/kg (GB-04D), 813 mg/kg (GB-06D) and 1,320 mg/kg (GB-07F) which exceed the lower initial PRG value of 500 mg/kg; only one sample (GB-07F) exceeded the upper initial PRG value of 1,000 mg/kg. Arsenic (PRG 3.2 mg/kg) was detected at concentrations ranging from 4 mg/kg (GBR-02B) to 11.2 mg/kg (B-1B).

Additional Parameters

Total organic carbon (TOC) concentrations ranged from 16,000 mg/kg (B-1B) to 62,900 mg/kg (GB-6D). Oil and grease concentrations by the gravimetric method ranged from 19,000 mg/kg

(GBR-02B) to 106,000 mg/kg (GB-07F) and concentrations by the infrared method ranged from 3,040 mg/kg (GB-14C) to 83,700 mg/kg (GB-4B).

3.3.2 Geotechnical Testing

Shelby tube soil samples were obtained of the peat and grey silt/bedded clay unit directly underlying the FOU fill. A total of seven Shelby tube samples were obtained and three were selected for index and strength testing. The detailed results of the geotechnical tests are included in Appendix F.

The boring investigation indicated that the peat consist predominately of an organic fibrous material up to 3 feet thick. As a result of the limited thickness of the peat material it was difficult to obtain a representative sample. Only one of the Shelby tubes recovered peat (sample ST-03 at location GB-02), however, this material was more representative of the contact between the peat and underlying grey silt/bedded clay. The bottom portion of the peat becomes less fibrous and comprises more of silty material. Based on the unconsolidated/undrained compressive strength (U/UCS) test performed on sample ST-03, the lower peat has a maximum undrained shear strength of 360 pounds per square foot (psf).

The underlying grey silt/bedded clay unit is variable in composition (e.g. sample ST-04 is predominately a clay material and sample ST-05 is predominately a silt material). U/UCS tests were completed on two Shelby tube samples (ST-04 at location GB-02 and ST-05 at location GB-01) and indicated maximum undrained shear strengths of 2,024 psf (ST-04) and 499 psf (ST-05).

Based on the data obtained from the geotechnical laboratory testing and information collected during the drilling program, slope stability calculations can be made to determine the maximum steepness of the excavation slope that would be stable without failure. Slope stability calculations are included in Appendix F and indicate that the critical failure mechanism is near surface failure through the fill. A slope of 4.5(H):1(V) or flatter would be required to achieve a marginal factor of safety under existing conditions.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The data collected and presented in this Report has identified a discrete area, as shown on Figure 6, that meets the criteria of a sludge "hot-spot", as defined in Section 1.0 of this Report. In summary, the data collected indicates the following:

- The sludge "hot-spot" area, as defined by its physical properties, is approximately 4,000 ft² in areal extent and consists of predominately of sludge material and fine grained soil with little debris. Assuming an average thickness of 10 feet, this equates to a volume of approximately 1,480 cubic yards.
- The chemical characteristics of the sludge "hot-spot" include the highest VOC and PCB concentrations detected anywhere on-Site.
- The geotechnical data and associated excavation stability analyses indicate that an excavation side slope of 4.5H:1V would only be marginally stable under existing conditions.

Excavation of the materials within the sludge "hot-spot" area would be extremely difficult given the physical constraints (e.g., slope stability) and the chemical characteristics of the material to be excavated (e.g., extremely high levels of VOCs present in the material). As discussed in detail in the Investigation Work Plan (Golder Associates, 1996), the implementation difficulties and risks associated with the sludge "hot-spot" excavation and handling at the Site are such that in-situ remedial alternatives warrant serious consideration in the FFS.

4.2 Recommendations

In order to explore the feasibility of in-situ treatment options, additional treatability study work is necessary. A work plan addressing the required scope of work and number of samples that will be collected will be submitted for USEPA approval. It should be noted that the schedule outlined in the Work Plan (Golder Associates, December 1995) included an optional item for treatability studies, should this be necessary based on data collected during this FFSI.

5.0 REFERENCES

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TABLE 1
 SAMPLING AND ANALYSES SUMMARY
 216 PATERSON PLANK ROAD SITE
 CARLSTADT, NEW JERSEY

| SAMPLE POINT ID | SAMPLE DEPTH (FT.) | SAMPLE MEDIA | SAMPLING DATE | ANALYTICAL PARAMETER (1) | QA/QC (2) | |
|-------------------------|--------------------------|------------------------|---------------|--|-----------------|--------|
| | | | | | FIELD DUPLICATE | MS/MSD |
| B-1B | 2-4 (VOC-3.5-4.0) | SILTY CLAY/CLAY (FILL) | 8/6/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | B-1B |
| GBR-02B | 2-4 (VOC-3.5-4.0) | SLUDGE | 8/18/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | |
| GBR-02C | 4-5.2 (VOC-4.7-5.2) | SLUDGE | 8/18/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | |
| GB-04B | 2-4 (VOC-3-3.5) | SILTY CLAY (FILL) | 8/11/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | GB-04B |
| GB-04D | 6-8 (VOC-6.5-7.0) | SLUDGE | 8/11/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | FGB-04D | |
| GB-06D | 6-8 (VOC-7.2-7.7) | SLUDGE/SOIL (FILL) | 8/11/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | |
| GB-07F | 10-12 (VOC-10.8-11.3) | SLUDGE/SOIL (FILL) | 8/12/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | |
| GB-14C | 4-5.7 (VOC-5.2-5.7) | SLUDGE | 8/15/97 | TCL/TAL, pH, moisture content, grain size analysis, TOC, and oil & grease | | |
| GEOTECHNICAL (3) | | | | | | |
| ST-03 (GB-02) | 8.5-11.0 | PEAT | 8/7/97 | Unconsolidated undrained triaxial compression with pore water pressure measurement & grain size analysis | | |
| ST-04 (GB-02) | 12.5-15.0 | SILTY CLAY | 8/7/97 | Unconsolidated undrained triaxial compression with pore water pressure measurement & grain size analysis | | |
| ST-05 (GB-01) | 8.5-11.0 | SILT | 8/8/97 | Unconsolidated undrained triaxial compression with pore water pressure measurement & grain size analysis | | |

Notes:

- (1) - TCL VOCs, SVOCs, and Pest/PCBs Methodology: CLP SOW OLMO3.2 (CompuChem OLMO3.1); TAL Metals Methodology: CLP SOW ILMO3.0 (CompuChem ILMO4.0); Oil & Grease Methodology: SW846-9070/EPA 413.2, Total Organic Carbon Methodology: EPA Lloyd Khan Method, pH Methodology: LaMotte; Moisture Content Methodology: ASTM D2216; Grain Size Analysis Methodology: ASTM D-412/422 & D-1140; and, unconsolidated undrained triaxial compression with pore water pressure measurement Methodology: ASTM D-2850
- (2) - Equipment Rinsate Blanks were taken one per day of sampling.
- (3) - A total of seven Shelby tube samples were collected of which three samples, based on recovery, were submitted for analysis.

**TABLE 2A
SUMMARY OF CHEMISTRY ANALYSIS DETECTIONS
SOIL/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
ORGANIC DETECTIONS - VOLATILES**

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | B-1B | GBR-02B | GBR-02C | GB-4B | GB-4D | FGB-4D (Dup.) |
|---------------------------------------|--------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | | Sampled: 8/6/97 RESULT (mg/kg) | Sampled: 8/18/97 RESULT (mg/kg) | Sampled: 8/18/97 RESULT (mg/kg) | Sampled: 8/11/97 RESULT (mg/kg) | Sampled: 8/11/97 RESULT (mg/kg) | Sampled: 8/11/97 RESULT (mg/kg) |
| 198 | Benzene | - | 28 | 38 | 34 | 73 | 66 |
| 1,220,000 | 2-Butanone | - | - | - | - | 260 | - |
| 40,000 | Chlorobenzene | 8.4 | 86 | 74 | 380 | 1,200 | 1,000 |
| 940 | Chloroform | - | - | - | 54 | 30 | 31 |
| 200,000 | 1,1-Dichloroethane | 3.4 | - | - | 51 | 210 | 160 |
| - | Total 1,2-Dichloroethene | 4.2 | - | - | 30 | 24 | - |
| 62 | 1,2-Dichloroethane | - | - | - | - | - | - |
| 200,000 | Ethylbenzene | 110 | 420 | 350 | 940 | 1,100 | 970 |
| 760 | Methylene Chloride | - | 38 | 38 | 52 | 100 | 100 |
| - | 4-Methyl-2-Pentanone | 19 | - | 97 | 190 | 460 | 420 |
| 184,000 | 1,1,1-Trichloroethane | - | - | - | 430 | 150 | 150 |
| 110 | Tetrachloroethene | 330 | 1,200 | 880 | 5,200 | 6,200 | 4,600 |
| 400,000 | Toluene | 470 | 2,200 | 1,800 | 4,700 | 5,900 | 4,500 |
| 520 | Trichloroethene | 520 | 2,400 | 1,600 | 6,000 | 6,700 | 5,500 |
| 3 | Vinyl chloride | - | - | 58 | - | - | - |
| 4,000,000 | Total Xylenes | 720 | 2,600 | 2,100 | 5,300 | 5,700 | 5,200 |

Notes: 2200
Units are in mg/kg.

9,000

7,000

23,000

28,500

23,000

(1) - EPA initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services. All results reported on a wet weight basis.

"-" indicates that no initial PRG is available.

Indicates exceedance of the EPA initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U" or "UJ".

TABLE 2A
SUMMARY OF CHEMISTRY ANALYSIS DETECTIONS
SOIL/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
ORGANIC DETECTIONS - VOLATILES

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | GB-6D | GB-7F | GB-14C |
|---------------------------------------|--------------------------|------------------------------------|------------------------------------|------------------------------------|
| | | Sampled: 8/11/97 RESULT (mg/kg) | Sampled: 8/12/97 RESULT (mg/kg) | Sampled: 8/15/97 RESULT (mg/kg) |
| 198 | Benzene | 57 | 62 | 28 |
| 1,220,000 | 2-Butanone | 340 | 370 | 57 |
| 40,000 | Chlorobenzene | 260 | 260 | 49 |
| 940 | Chloroform | 240 | 340 | - |
| 200,000 | 1,1-Dichloroethane | 120 | - | 16 |
| -- | Total 1,2-Dichloroethene | 49 | 28 | - |
| 62 | 1,2-Dichloroethane | - | 340 | - |
| 200,000 | Ethylbenzene | 1,100 | 1,100 | 100 |
| 760 | Methylene Chloride | 200 | 450 | - |
| -- | 4-Methyl-2-Pentanone | 440 | 470 | 42 |
| 184,000 | 1,1,1-Trichloroethane | 1,200 | 2,700 | - |
| 110 | Tetrachloroethene | 6,000 | 8,900 | 370 |
| 400,000 | Toluene | 5,700 | 6,700 | 410 |
| 520 | Trichloroethene | 7,300 | 8,900 | 99 |
| 3 | Vinyl chloride | - | - | 44 |
| 4,000,000 | Total Xylenes | 6,100 | 5,700 | 550 |

Notes:

Units are in mg/kg.

29,200
36,300

1800

(1) - EPA Initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.
All results reported on a wet weight basis.

"--" indicates that no initial PRG is available.

Indicates exceedance of the EPA initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U" or "UJ".

TABLE 2B
SUMMARY OF CHEMICAL ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
ORGANIC DETECTIONS - SEMIVOLATILES

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | B-1B | GBR-02B | GBR-02C | GB-4B | GB-4D | FGB-4D (Dup.) |
|---------------------------------------|----------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | | Sampled:8/6/97 RESULT (mg/kg) | Sampled:8/18/97 RESULT (mg/kg) | Sampled:8/18/97 RESULT (mg/kg) | Sampled:8/11/97 RESULT (mg/kg) | Sampled:8/11/97 RESULT (mg/kg) | Sampled:8/11/97 RESULT (mg/kg) |
| 50,000 | Phenol | 1.7 | 56 | 72 | 48 | 64 | 70 |
| 184,000 | 1,2-Dichlorobenzene | 0.6 | 14 | 8.4 | 34 | 28 | 19 |
| --- | 1,4-Dichlorobenzene | 0.33 | - | - | - | - | - |
| --- | 2-Methylphenol | - | 3.5 | 3.3 | - | - | - |
| --- | 4-Methylphenol | 0.46 | 13 | 15 | 18 | 15 | 16 |
| 1,020 | Nitrobenzene | - | - | - | - | - | - |
| 6,000 | Isophorone | 1.4 | 50 | 13 | - | 14 | 8.7 |
| 40,000 | 2,4-Dimethylphenol | - | 12 | 11 | 9.9 | - | 9 |
| 20,000 | 1,2,4-Trichlorobenzene | 0.081 | 2.3 | 0.95 | 3.3 | 3 | 2 |
| 82,000 | Napthalene | 1.1 | 51 | 18 | 75 | 52 | 30 |
| --- | 2-Methylnapthalene | 0.51 | 21 | 6.5 | 25 | 18 | 12 |
| --- | 2-Chloronapthalene | - | 55 | 40 | 31 | 22 | 16 |
| 2,000,000 | Dimethylphthalate | - | - | - | 2.4 | - | - |
| 122,000 | Acenaphthene | - | 1.6 | - | 0.89 | - | - |
| --- | Dibenzofuran | 0.16 | 5.4 | 2.1 | 2.6 | 3.2 | 2 |
| 1,640,000 | Diethylphthalate | - | - | - | 12 | 1.2 | 1.5 |
| 82,000 | Fluorene | 0.077 | 3.2 | 0.89 | 1.2 | 1.6 | 1.2 |
| --- | Phenanthrene | 0.24 | 12 | 4.3 | 4.1 | 4.2 | 2.8 |
| 620,000 | Anthracene | - | 1.8 | - | - | - | - |
| --- | Carbazole | - | 0.92 | - | - | - | - |
| --- | Di-n-butylphthalate | 0.37 | - | - | 52 | 8.7 | 9.1 |
| 82,000 | Fluoranthene | - | 6.9 | 1.8 | 2.5 | 2 | 1.3 |
| 62,000 | Pyrene | - | 4.6 | 1.1 | 1.6 | 1.8 | 0.98 |
| 400,000 | Butylbenzylphthalate | 0.043 | - | - | 20 | 2.2 | 2.9 |
| 7.8 | Benzo(a)anthracene | - | 2.4 | 0.55 | 0.9 | 0.59 | 0.47 |
| 78,000 | Chrysene | - | 3 | 0.72 | 1.1 | 1.1 | 0.81 |
| 400 | Bis(2-ethylhexyl)phthalate | 7.3 | 37 | 8.5 | 500 | 190 | 110 |
| 40,000 | Di-n-octylphthalate | 0.5 | - | - | 23 | 4.5 | 4.7 |
| 7.8 | Benzo(b)fluoranthene | 0.069 | 2.3 | - | 0.82 | 0.7 | - |
| 78 | Benzo(k)fluoranthene | 0.068 | 1.6 | - | 0.62 | 0.49 | - |
| 0.78 | Benzo(a)pyrene | - | 1.2 | - | - | - | - |
| 7.8 | Indeno(1,2,3-cd)pyrene | - | 1.3 | - | - | - | - |
| 0.78 | Dibenz(a,h)anthracene | - | 1.1 | - | - | - | - |
| --- | Benzo(g,h,i)perylene | - | 1.4 | - | 0.6 | - | - |

Notes:

Units are in mg/kg.

(1) - EPA initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.

All results reported on a wet weight basis.

"-" indicates that no Initial PRG is available.

Indicates exceedance of the EPA initial PRG.

"U" indicates that the constituent was not detected as qualified with a "U", "UJ" or "R".

TABLE 2B
SUMMARY OF CHEMICAL ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
ORGANIC DETECTIONS - SEMIVOLATILES

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | GB-6D | GB-7F | GB-14C |
|---------------------------------------|----------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | | Sampled:8/11/97 RESULT (mg/kg) | Sampled:8/12/97 RESULT (mg/kg) | Sampled:8/15/97 RESULT (mg/kg) |
| 50,000 | Phenol | 140 | 95 | 25 |
| 184,000 | 1,2-Dichlorobenzene | 57 | 130 | 3.4 |
| --- | 1,4-Dichlorobenzene | - | - | - |
| --- | 2-Methylphenol | - | - | - |
| --- | 4-Methylphenol | 24 | 20 | 5.6 |
| 1,020 | Nitrobenzene | - | 380 | - |
| 6,000 | Isophorone | 33 | 20 | 1.1 |
| 40,000 | 2,4-Dimethylphenol | 19 | 10 | 4.7 |
| 20,000 | 1,2,4-Trichlorobenzene | 5.7 | - | - |
| 82,000 | Napthalene | 73 | 57 | 3 |
| --- | 2-Methylnapthalene | 28 | 21 | 1.1 |
| --- | 2-Chloronapthalene | 97 | 35 | 23 |
| 2,000,000 | Dimethylphthalate | - | - | - |
| 122,000 | Acenaphthene | - | - | - |
| --- | Dibenzofuran | 3.9 | - | - |
| 1,640,000 | Diethylphthalate | 4.2 | 13 | - |
| 82,000 | Fluorene | 2 | - | - |
| --- | Phenanthrene | 6.3 | 5.5 | - |
| 620,000 | Anthracene | - | - | - |
| --- | Carbazole | - | - | - |
| --- | Di-n-butylphthalate | 42 | 56 | - |
| 82,000 | Fluoranthene | 3.7 | - | - |
| 62,000 | Pyrene | 3.6 | - | - |
| 400,000 | Butylbenzylphthalate | 19 | 37 | - |
| 7.8 | Benzo(a)anthracene | 1.7 | - | - |
| 78,000 | Chrysene | 2 | - | - |
| 400 | Bis(2-ethylhexyl)phthalate | 610 | 430 | 1.3 |
| 40,000 | Di-n-octylphthalate | 37 | 17 | - |
| 7.8 | Benzo(b)fluoranthene | - | - | - |
| 78 | Benzo(k)fluoranthene | - | - | - |
| 0.78 | Benzo(a)pyrene | 0.55 | - | - |
| 7.8 | Indeno(1,2,3-cd)pyrene | 0.79 | - | - |
| 0.78 | Dibenz(a,h)anthracene | - | - | - |
| --- | Benzo(g,h,i)perylene | 1.2 | - | - |

Notes:

Units are in mg/kg.

(1) - EPA Initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services. All results reported on a wet weight basis.

"---" Indicates that no initial PRG is available.

"610" Indicates exceedance of the EPA initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U", "UU" or "R".

TABLE 2C
SUMMARY OF CHEMICAL ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
PESTICIDE/PCB DETECTIONS

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | B-1B | GBR-02B | GBR-02C | GB-4B | GB-4D | FGB-4D (Dup.) |
|---------------------------------------|----------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| | | Sampled: 8/6/97 | Sampled: 8/18/97 | Sampled: 8/18/97 | Sampled: 8/11/97 | Sampled: 8/11/97 | Sampled: 8/11/97 |
| | | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) |
| — | Endrine Ketone | - | - | - | - | - | - |
| 0.34 | Aldrin | 1.6 | - | - | - | - | 12 |
| 0.36 | Dieldrin | 0.86 | - | - | - | - | - |
| 10-25 | Aroclor-1242 | 49 | 390 | 300 | 770 | 800 | 680 |

Notes:

Units are in mg/kg.

(1) - EPA Initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.

All results reported on a wet weight basis.

"—" indicates that no initial PRG is available.

Indicates exceedance of the EPA initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U", "UJ" or "R".

TABLE 2C
SUMMARY OF CHEMICAL ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
PESTICIDE/PCB DETECTIONS

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | GB-6D | GB-7F | GB-14C |
|---------------------------------------|----------------|------------------------------------|------------------------------------|------------------------------------|
| | | Sampled: 8/11/97 RESULT (mg/kg) | Sampled: 8/12/97 RESULT (mg/kg) | Sampled: 8/15/97 RESULT (mg/kg) |
| — | Endrine Ketone | - | - | - |
| 0.34 | Aldrin | - | - | - |
| 0.36 | Dieldrin | - | - | - |
| 10-25 | Aroclor-1242 | 1,400 | 1,300 | 82 |

Notes:

Units are in mg/kg.

(1) - EPA Initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.
 All results reported on a wet weight basis.

"—" indicates that no initial PRG is available.

Indicates exceedance of the EPA initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U", "UJ" or "R".

TABLE 2D
SUMMARY OF CHEMISTRY ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
INORGANIC DETECTIONS

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | B-1B | GBR-02B | GBR-02C | GB-4B | GB-4D | FGB-4D (Dup.) |
|---------------------------------------|-----------|-----------------|------------------|------------------|------------------|------------------|------------------|
| | | Sampled: 8/6/97 | Sampled: 8/18/97 | Sampled: 8/18/97 | Sampled: 8/11/97 | Sampled: 8/11/97 | Sampled: 8/11/97 |
| | | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) |
| --- | Aluminum | 5,140 | 5,040 | 3,090 | 4,270 | 3,890 | 3,800 |
| 820 | Antimony | 1.4 | 1.3 | 2.7 | 10.1 | 8.1 | 7.4 |
| 3.2 | Arsenic | 11.2 | 4.0 | 6.1 | 12.7 | 9.3 | 7.6 |
| --- | Barium | 349 | 91.6 | 119 | 590 | 637 | 653 |
| 1.34 | Beryllium | 0.41 | 0.56 | 0.86 | 1.80 | 1.30 | 1.30 |
| 1,020 | Cadmium | 147 | 6.4 | 10 | 43.4 | 52 | 39 |
| --- | Calcium | 19,200 | 18,800 | 37,300 | 23,900 | 37,400 | 36,700 |
| 10,200 (VI) | Chromium | 58 | 91.9 | 203 | 209 | 265 | 255 |
| --- | Cobalt | 2.9 | 2.7 | 1.9 | 5.6 | 4.7 | 4.2 |
| 76,000 | Copper | 5,760 | 975 | 2,590 | 6,350 | 4,180 | 4,250 |
| --- | Iron | 9,830 | 6,140 | 4,920 | 13,600 | 11,400 | 10,000 |
| 500-1,000 | Lead | 245 | 228 | 479 | 947 | 999 | 985 |
| --- | Magnesium | 2,780 | 1,340 | 5,280 | 2,260 | 3,280 | 3,240 |
| --- | Manganese | 124 | 80.7 | 123 | 189 | 181 | 168 |
| 620 | Mercury | 2.2 | 7.5 | 2.9 | 4.7 | 4.4 | 3.7 |
| 40,000 | Nickel | 10.5 | 9.9 | 12.8 | 16.7 | 19.9 | 18.9 |
| --- | Potassium | 395 | 625 | 480 | 507 | 537 | 529 |
| 10,200 | Selenium | 3.8 | - | 1.1 | 1.7 | 2.2 | 2.0 |
| 10,200 | Silver | 0.53 | 2.8 | 4.9 | 1.4 | 6.9 | 7.2 |
| --- | Sodium | 6,550 | 35,800 | 44,500 | 10,100 | 28,000 | 28,200 |
| 144 | Thallium | - | - | - | - | - | - |
| --- | Vanadium | 12.3 | 12.9 | 12.3 | 19.2 | 17.5 | 16.7 |
| 620,000 | Zinc | 242 | 268 | 365 | 1,840 | 2,260 | 2,500 |

Notes:

Units are in mg/kg.

(1) - EPA Initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.

All results reported on a wet weight basis.

"---" indicates that no initial PRG is available.

[Shaded box] Indicates exceedance of the EPA Initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U" or "UJ".

TABLE 2D
SUMMARY OF CHEMISTRY ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
INORGANIC DETECTIONS

| EPA INITIAL PRGs (1) (mg/kg) | PARAMETER | GB-6D | GB-7F | GB-14C |
|---------------------------------------|-----------|------------------------------------|------------------------------------|------------------------------------|
| | | Sampled: 8/11/97 RESULT (mg/kg) | Sampled: 8/12/97 RESULT (mg/kg) | Sampled: 8/15/97 RESULT (mg/kg) |
| --- | Aluminum | 4,830 | 2,660 | 3,990 |
| 820 | Antimony | 6.0 | 12.8 | 1.2 |
| 3.2 | Arsenic | 10.8 | 9.3 | 5.1 |
| --- | Barium | 619 | 702 | 68.3 |
| 1.34 | Beryllium | 1.0 | 0.72 | 2.50 |
| 1,020 | Cadmium | 34.1 | 47.4 | 6.7 |
| --- | Calcium | 25,600 | 19,800 | 21,900 |
| 10,200 (VI) | Chromium | 260 | 233 | 71.5 |
| --- | Cobalt | 4.4 | 4.5 | 1.4 |
| 76,000 | Copper | 2,970 | 1,830 | 10,200 |
| --- | Iron | 12,000 | 22,700 | 3,370 |
| 500-1,000 | Lead | 813 | 1,320 | 152 |
| --- | Magnesium | 2,550 | 1,420 | 5,260 |
| --- | Manganese | 198 | 153 | 81.1 |
| 620 | Mercury | 6.2 | 3.1 | 0.79 |
| 40,000 | Nickel | 14.8 | 12.4 | 7.6 |
| --- | Potassium | 496 | 300 | 443 |
| 10,200 | Selenium | 1.1 | 2.0 | - |
| 10,200 | Silver | 1.4 | 1.8 | 0.6 |
| --- | Sodium | 13,900 | 8,540 | 35,500 |
| 144 | Thallium | - | - | - |
| --- | Vanadium | 18.9 | 19.3 | 6.7 |
| 620,000 | Zinc | 2,980 | 10,000 | 218 |

Notes:

Units are in mg/kg.

(1) -EPA Initial Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services. All results reported on a wet weight basis.

"---" indicates that no initial PRG is available.

[Shaded] Indicates exceedance of the EPA initial PRG.

"-" indicates that the constituent was not detected as qualified with a "U" or "UJ".

TABLE 2E
SUMMARY OF CHEMISTRY ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
ADDITIONAL PARAMETER DETECTIONS

| INITIAL EPA PRGs (1) (mg/kg) | PARAMETER | B-1B | GBR-02B | GBR-02C | GB-4B | GB-4D | FGB-4D (Dup.) |
|---------------------------------------|-----------------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| | | Sampled: 8/6/97 | Sampled: 8/18/97 | Sampled: 8/18/97 | Sampled: 8/11/97 | Sampled: 8/11/97 | Sampled: 8/11/97 |
| | | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) |
| --- | Oil and Grease, Gravimetric | (2) | 19000 | * 42000 | 50900 | 44800 | 41300 |
| --- | Oil and Grease, Infrared | 18700 * | 27000 | 28300 | 83700 | 21900 | 17800 |
| --- | TOC | 16000 | 31700 x | 36600 | 53500 | 61500 | 52600 |

Notes:

Units are in mg/kg.

(1) - Initial EPA Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.

(2) - Analysis not performed.

All results reported on a wet weight basis (sludge) except for sample B-1B.

"--" indicates that no initial PRG is available.

Indicates exceedance of the initial EPA PRG.

"*" indicates that the constituent was not detected as qualified with a "U" or "UJ".

1. assess test results

2. should add chem. conc.
(VOC, SOVC, P/P)

TABLE 2E
SUMMARY OF CHEMISTRY ANALYSIS DETECTIONS
SLUDGE/FILL SAMPLES
216 PATERSON PLANK ROAD SITE
ADDITIONAL PARAMETER DETECTIONS

| INITIAL EPA PRGs (1) (mg/kg) | PARAMETER | | | |
|---------------------------------------|-----------------------------|------------------|------------------|------------------|
| | | GB-6D | GB-7F | GB-14C |
| | | Sampled: 8/11/97 | Sampled: 8/12/97 | Sampled: 8/15/97 |
| | | RESULT (mg/kg) | RESULT (mg/kg) | RESULT (mg/kg) |
| --- | Oil and Grease, Gravimetric | 57200 | 106000 | 76900 |
| --- | Oil and Grease, Infrared | 38400 | 47800 | 3040 |
| --- | TOC | 62900 | 30600 | 30800 |

Notes:

Units are in mg/kg.

(1) - Initial EPA Preliminary Remediation Goals (PRGs) taken from a letter dated November 19, 1993 from EPA to Langan Environmental Services.

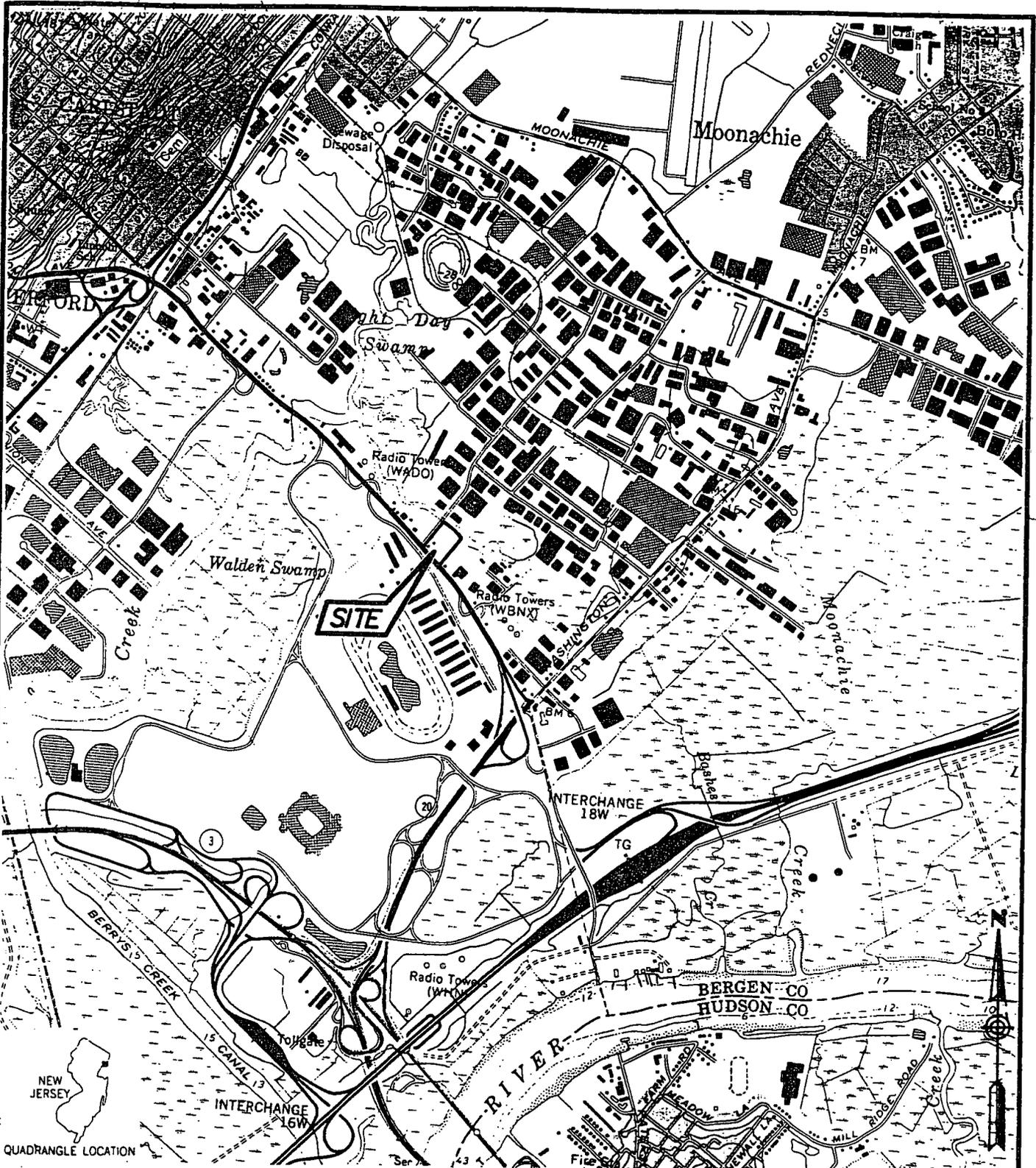
(2) - Analysis not performed.

All results reported on a wet weight basis (sludge) except for sample B-1B.

"--" indicates that no initial PRG is available.

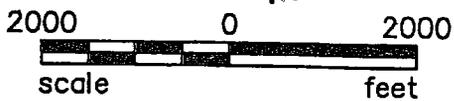
Indicates exceedance of the initial EPA PRG.

"." indicates that the constituent was not detected as qualified with a "U" or "UJ".



REFERENCE

- 1.) USGS 7.5 MINUTE WEEHAWKEN QUADRANGLE, NEW JERSEY - NEW YORK, DATE 1967, PHOTOREVISED 1981.



NOV 21 1997

| | | | |
|----------|----------|--------------|----------|
| JOB No.: | 943-6222 | SCALE: | AS SHOWN |
| DR BY: | JSG | DATE: | 06/05/95 |
| CHK BY: | SDM | FILE No.: | NJ03-266 |
| REV BY: | RJ | DR SUBTITLE: | 03 |

SITE LOCATION PLAN

Golder Associates

216 PATERSON PLANK ROAD SITE

FIGURE 1

REFERENCE

- 1.) TOPOGRAPHIC DATA AND SURFACE FEATURES BASED ON INFORMATION BY TAYLOR, WISEMAN & TAYLOR CONSULTING ENGINEERS/SURVEYORS/PLANNERS/LANDSCAPE ARCHITECTS, MOUNT LAUREL, NEW JERSEY, DATED 06/12/92, SCALE 1"=40'.
- 2.) MONITORING WELLS, PIEZOMETERS, AND EXTRACTION WELLS SURVEYED BY GEOD CORPORATION, NEWFOUNDLAND, NJ IN OCTOBER 1996 AND SOIL BORINGS IN AUGUST 1997.
- 3.) SLURRY WALL BORINGS AND FEATURES FROM THE INTERIM REMEDIAL MEASURES TAKEN FROM CANONIE ENVIRONMENTAL, 1992 "INTERIM REMEDY FOR FIRST OPERABLE UNIT", AUGUST 1992.
- 4.) DAMES & MOORE, 1990. "FINAL REPORT - REMEDIAL INVESTIGATION SCP SITE, CARLSTADT, NEW JERSEY", MARCH 1, 1990.
- 5.) DAMES & MOORE, 1989. - "TEST PIT INVESTIGATION SCP / CARLSTADT JULY 1989 CARLSTADT, NEW JERSEY", AUGUST 4, 1989.



NOV 21 1997

| REV | DATE | DESCRIPTION | DR BY | CHK BY | RVW BY |
|-----|------|-------------|-------|--------|--------|
| | | | | | |
| | | | | | |
| | | | | | |

PROJECT:

**216 PATERSON PLANK ROAD NPL SITE
CARLSTADT, NEW JERSEY**

SHEET TITLE:

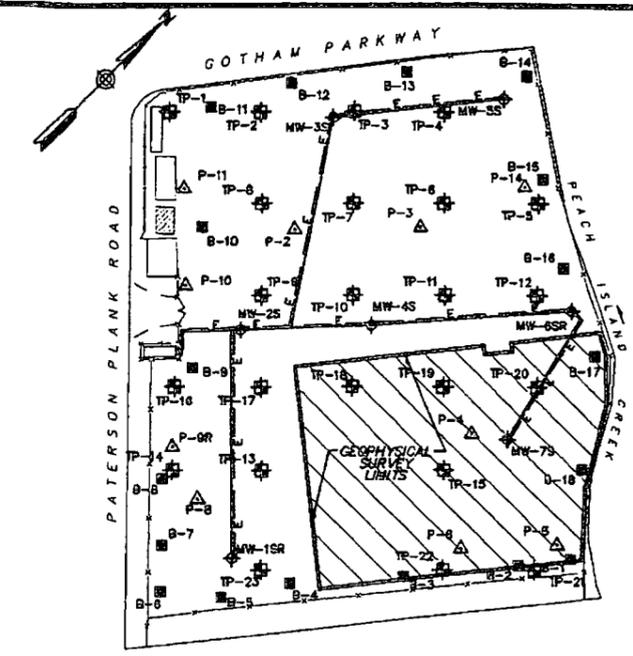
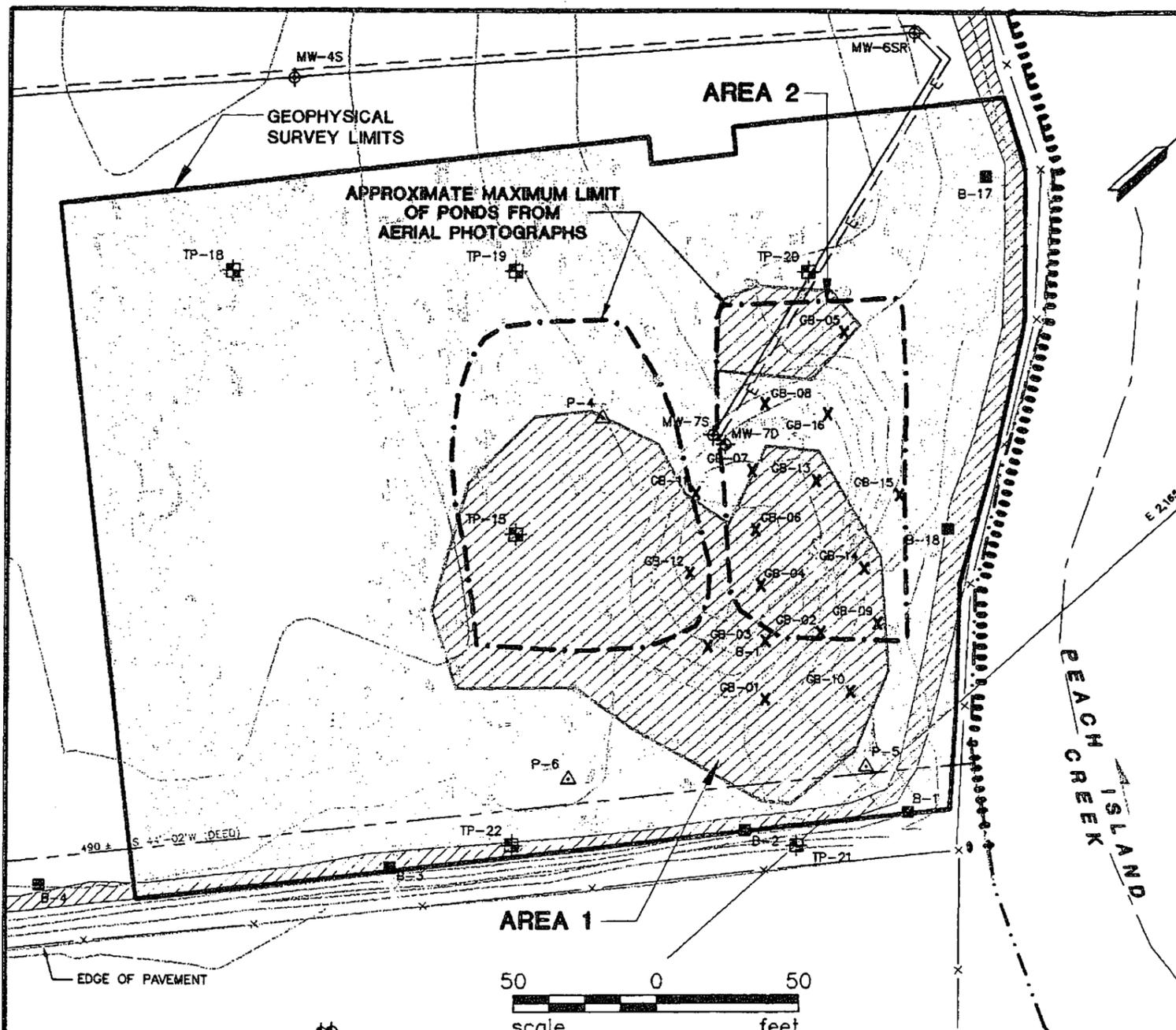
SITE PLAN



| | | |
|----------------------|-----|----------|
| PROJECT No. 943-6222 | | |
| CLIENT PROJ. No. | | |
| DES BY | SDM | 09/26/97 |
| DR BY | DWD | 10/14/97 |
| CHK BY | SDM | 11/2/97 |
| RVW BY | BT | 11/21/97 |

| | |
|--------------------|----------|
| FILE No.: | NJ03-744 |
| DRAFTING SUBTITLE: | 13 |
| SCALE: | AS SHOWN |

FIGURE 2



LEGEND

| | | | |
|--|--|--|------------------------------------|
| | AREAS INTERPRETED AS CLEAR FOR DRILLING (AREAS INTERPRETED AS CLEAR OF LARGE BURIED METAL OBJECTS WITHIN 10 FEET OF GROUND SURFACE) | | PROPERTY/RIGHT-OF-WAY BOUNDARIES |
| | INTERPRETED SLUDGE AREA | | 1 FT. CONTOUR LINE (FT. - MSL) |
| | SOIL BORING LOCATION (COMPLETED AS PART OF THE FFS INVESTIGATION) | | EDGE OF STREAM |
| | EXISTING MONITORING WELL (INSTALLED DURING THE REMEDIAL INVESTIGATION) | | FENCE |
| | SHALLOW PIEZOMETER (INSTALLED DURING THE REMEDIAL INVESTIGATION) | | SLURRY WALL ALIGNMENT |
| | EXTRACTION WELL (INSTALLED DURING THE REMEDIAL INVESTIGATION AND RETROFITTED FOR SHALLOW GROUNDWATER EXTRACTION AS PART OF THE IRM CONSTRUCTION) | | SHEET PILE WALL ALIGNMENT |
| | SLURRY WALL CONSTRUCTION INVESTIGATION BORING (INSTALLED DURING REMEDIAL DESIGN) | | ELECTRIC AND WATER DISCHARGE LINES |
| | TEST PIT (CONDUCTED DURING TEST PIT INVESTIGATION) | | |

NOTES

- COORDINATE SYSTEM SHOWN IS NEW JERSEY STATE PLANE NAD27 AND VERTICAL DATUM BASED ON NAVD 1929.
- LOCATION OF SLURRY WALL INVESTIGATION BORINGS AND TEST PIT LOCATIONS ARE APPROXIMATE. BORING & TEST PIT LOCATIONS WERE PREVIOUSLY SURVEYED USING A SITE SPECIFIC COORDINATE SYSTEM.

REFERENCE

- TOPOGRAPHIC DATA AND SURFACE FEATURES BASED ON INFORMATION BY TAYLOR, WISEMAN & TAYLOR CONSULTING ENGINEERS/SURVEYORS/PLANNERS/LANDSCAPE ARCHITECTS, MOUNT LAUREL, NEW JERSEY, DATED 08/12/92, SCALE 1"=40'.
- MONITORING WELLS, PIEZOMETERS, AND EXTRACTION WELLS SURVEYED BY GEOD CORPORATION, NEWFOUNDLAND, NJ IN OCTOBER 1996 AND SOIL BORINGS IN AUGUST 1997.
- SLURRY WALL BORINGS AND FEATURES FROM THE INTERIM REMEDIAL MEASURES TAKEN FROM CANONIE ENVIRONMENTAL, 1992 "INTERIM REMEDY FOR FIRST OPERABLE UNIT", AUGUST 1992.
- DAMES & MOORE, 1990. "FINAL REPORT - REMEDIAL INVESTIGATION SCP SITE, CARLSTADT, NEW JERSEY", MARCH 1, 1990.
- DAMES & MOORE, 1989. - "TEST PIT INVESTIGATION SCP / CARLSTADT JULY 1989 CARLSTADT, NEW JERSEY", AUGUST 4, 1989.

| | | | |
|----------|----------|--------------|----------|
| JOB No.: | 943-6222 | SCALE: | AS SHOWN |
| DR BY: | DWD | DATE: | 10/14/97 |
| CHK BY: | SDM | FILE No.: | NJ03-745 |
| REV BY: | | DR SUBTITLE: | 13 |

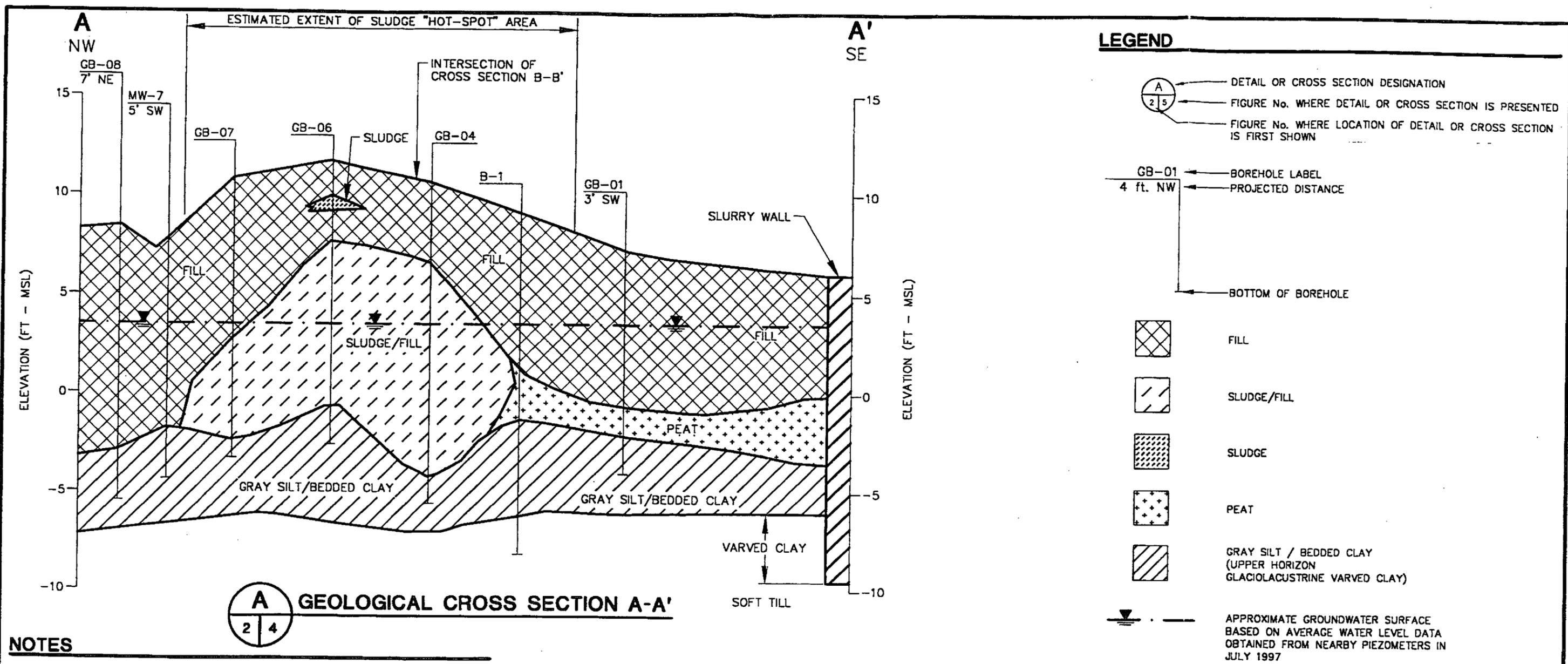
SUMMARY OF GEOPHYSICAL SURVEY RESULTS

Golder Associates

216 PATERSON PLANK ROAD SITE

FIGURE 3

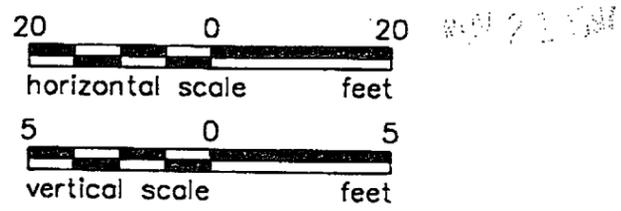
NOV 21 1997



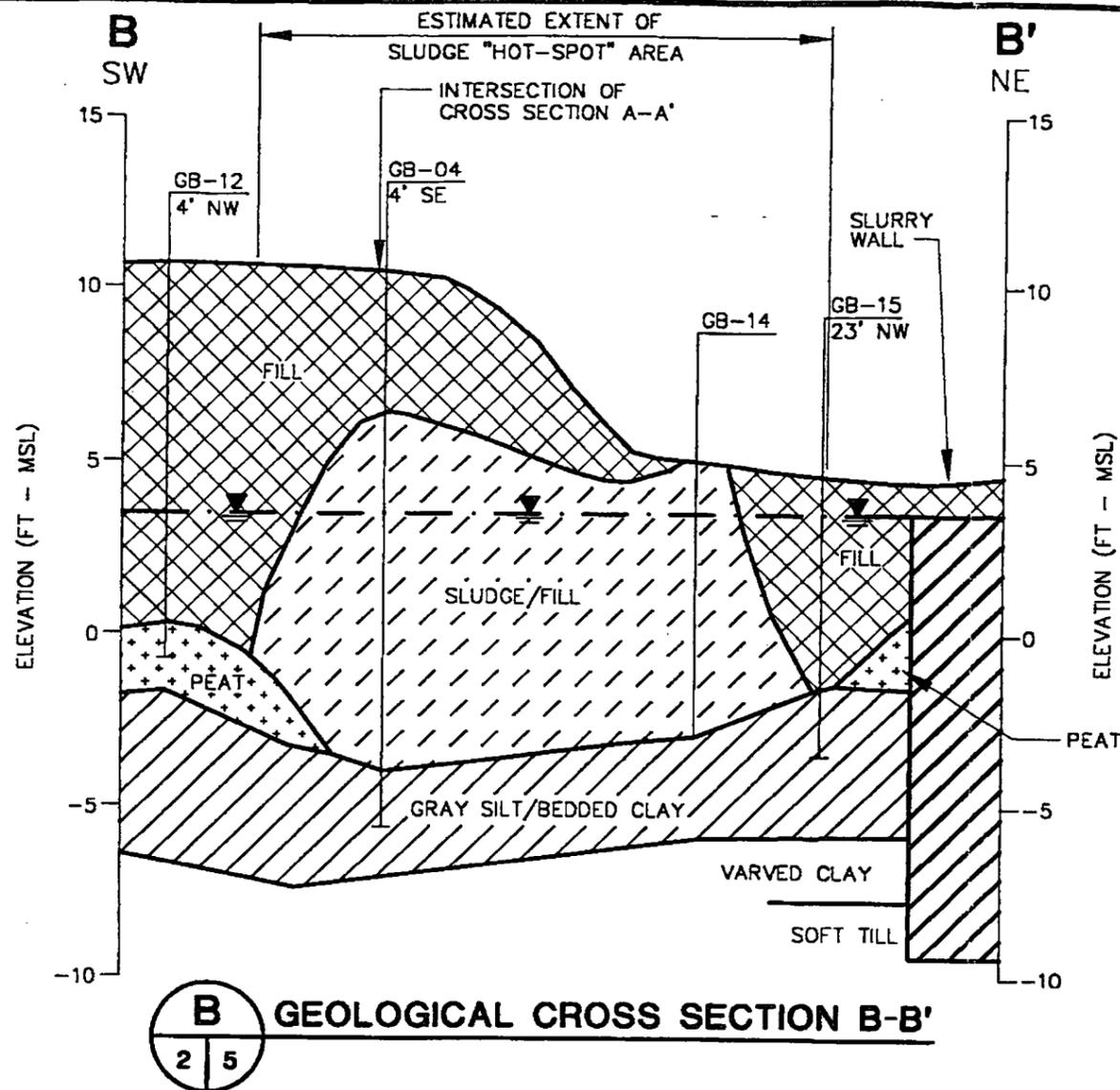
A
2 | 4
GEOLOGICAL CROSS SECTION A-A'

- NOTES**
- 1.) COORDINATE SYSTEM SHOWN IS NEW JERSEY STATE PLANE NAD27 AND VERTICAL DATUM BASED ON NAVD 1929.
 - 2.) LOCATION OF SLURRY WALL INVESTIGATION BORINGS AND TEST PIT LOCATIONS ARE APPROXIMATE. BORING & TEST PIT LOCATIONS WERE PREVIOUSLY SURVEYED USING A SITE SPECIFIC COORDINATE SYSTEM.

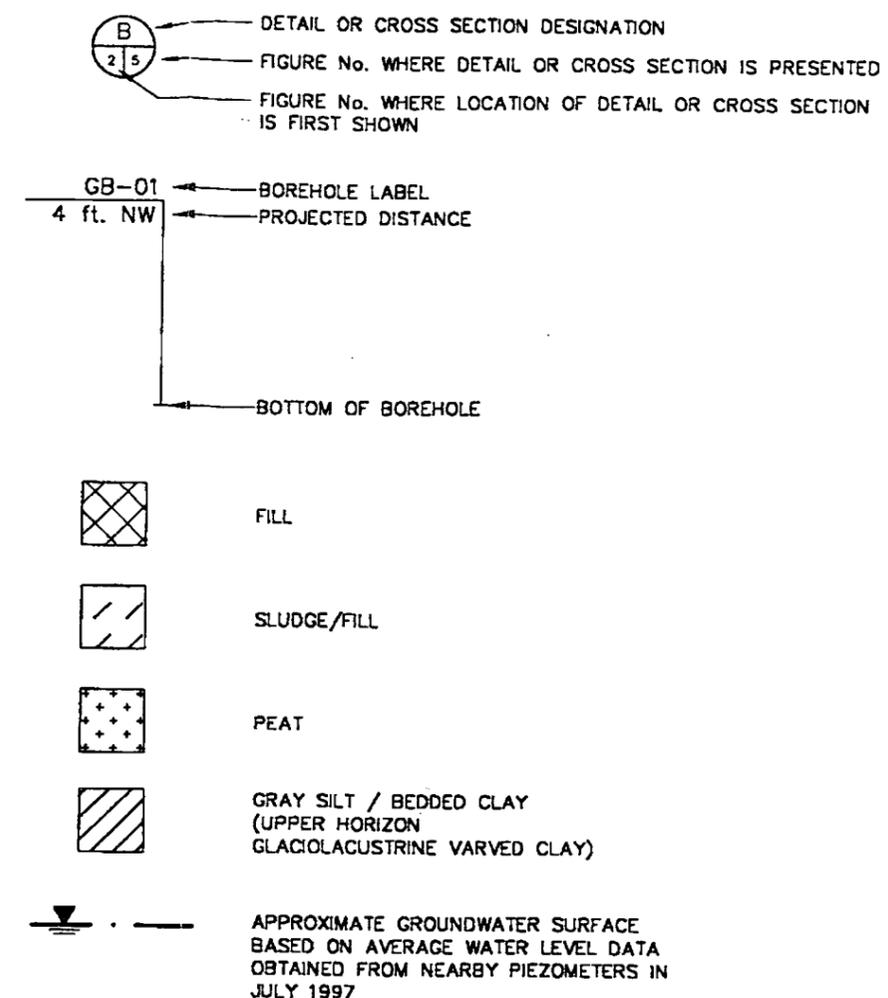
- REFERENCE**
- 1.) TOPOGRAPHIC DATA AND SURFACE FEATURES BASED ON INFORMATION BY TAYLOR, WISEMAN & TAYLOR CONSULTING ENGINEERS/SURVEYORS/PLANNERS/LANDSCAPE ARCHITECTS, MOUNT LAUREL, NEW JERSEY, DATED 06/12/92, SCALE 1"=40'.
 - 2.) MONITORING WELLS, PIEZOMETERS, AND EXTRACTION WELLS SURVEYED BY GEOD CORPORATION, NEWFOUNDLAND, NJ IN OCTOBER 1996 AND SOIL BORINGS IN AUGUST 1997.
 - 3.) SLURRY WALL BORINGS AND FEATURES FROM THE INTERIM REMEDIAL MEASURES TAKEN FROM CANONIE ENVIRONMENTAL, 1992 "INTERIM REMEDY FOR FIRST OPERABLE UNIT", AUGUST 1992.
 - 4.) DAMES & MOORE, 1990. "FINAL REPORT - REMEDIAL INVESTIGATION SCP SITE, CARLSTADT, NEW JERSEY", MARCH 1, 1990.
 - 5.) DAMES & MOORE, 1989. - "TEST PIT INVESTIGATION SCP / CARLSTADT JULY 1989 CARLSTADT, NEW JERSEY", AUGUST 4, 1989.



| | | | | |
|--------------------------|----------|--------------|----------|--------------------------------------|
| JOB No.: | 943-6222 | SCALE: | AS SHOWN | GEOLOGICAL CROSS SECTION A-A' |
| DR BY: | DWD | DATE: | 10/14/97 | |
| CHK BY: | SDM | FILE No.: | NJ03-774 | |
| REV BY: | | DR SUBTITLE: | 13 | |
| Golder Associates | | | | 216 PATERSON PLANK ROAD SITE |
| | | | | FIGURE 4 |



LEGEND

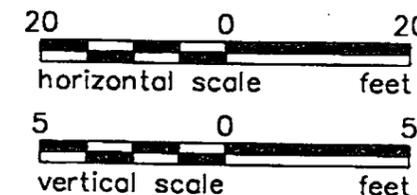


NOTES

- 1.) COORDINATE SYSTEM SHOWN IS NEW JERSEY STATE PLANE NAD27 AND VERTICAL DATUM BASED ON NAVD 1929.
- 2.) LOCATION OF SLURRY WALL INVESTIGATION BORINGS AND TEST PIT LOCATIONS ARE APPROXIMATE. BORING & TEST PIT LOCATIONS WERE PREVIOUSLY SURVEYED USING A SITE SPECIFIC COORDINATE SYSTEM.

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- 2.) MONITORING WELLS, PIEZOMETERS, AND EXTRACTION WELLS SURVEYED BY GEOD CORPORATION, NEWFOUNDLAND, NJ IN OCTOBER 1996 AND SOIL BORINGS IN AUGUST 1997.
- 3.) SLURRY WALL BORINGS AND FEATURES FROM THE INTERIM REMEDIAL MEASURES TAKEN FROM CANONIE ENVIRONMENTAL, 1992 "INTERIM REMEDY FOR FIRST OPERABLE UNIT", AUGUST 1992.
- 4.) DAMES & MOORE, 1990. "FINAL REPORT -- REMEDIAL INVESTIGATION SCP SITE, CARLSTADT, NEW JERSEY", MARCH 1, 1990.
- 5.) DAMES & MOORE, 1989. - "TEST PIT INVESTIGATION SCP / CARLSTADT JULY 1989 CARLSTADT, NEW JERSEY", AUGUST 4, 1989.



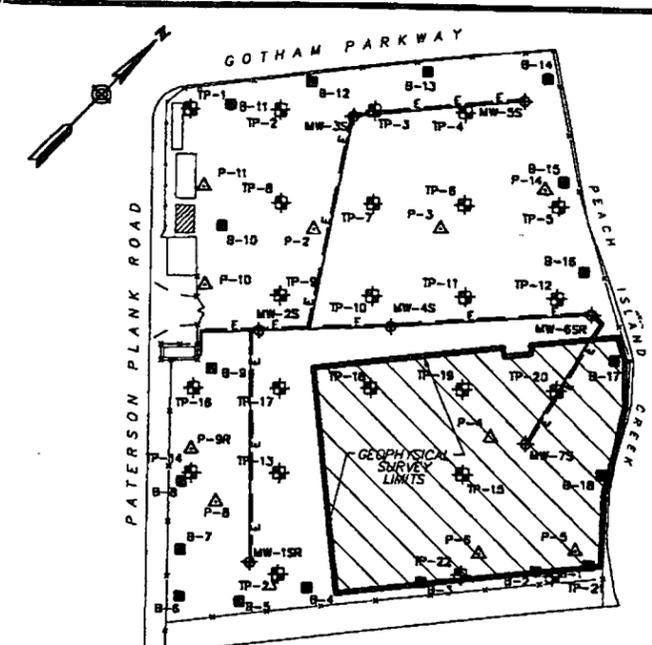
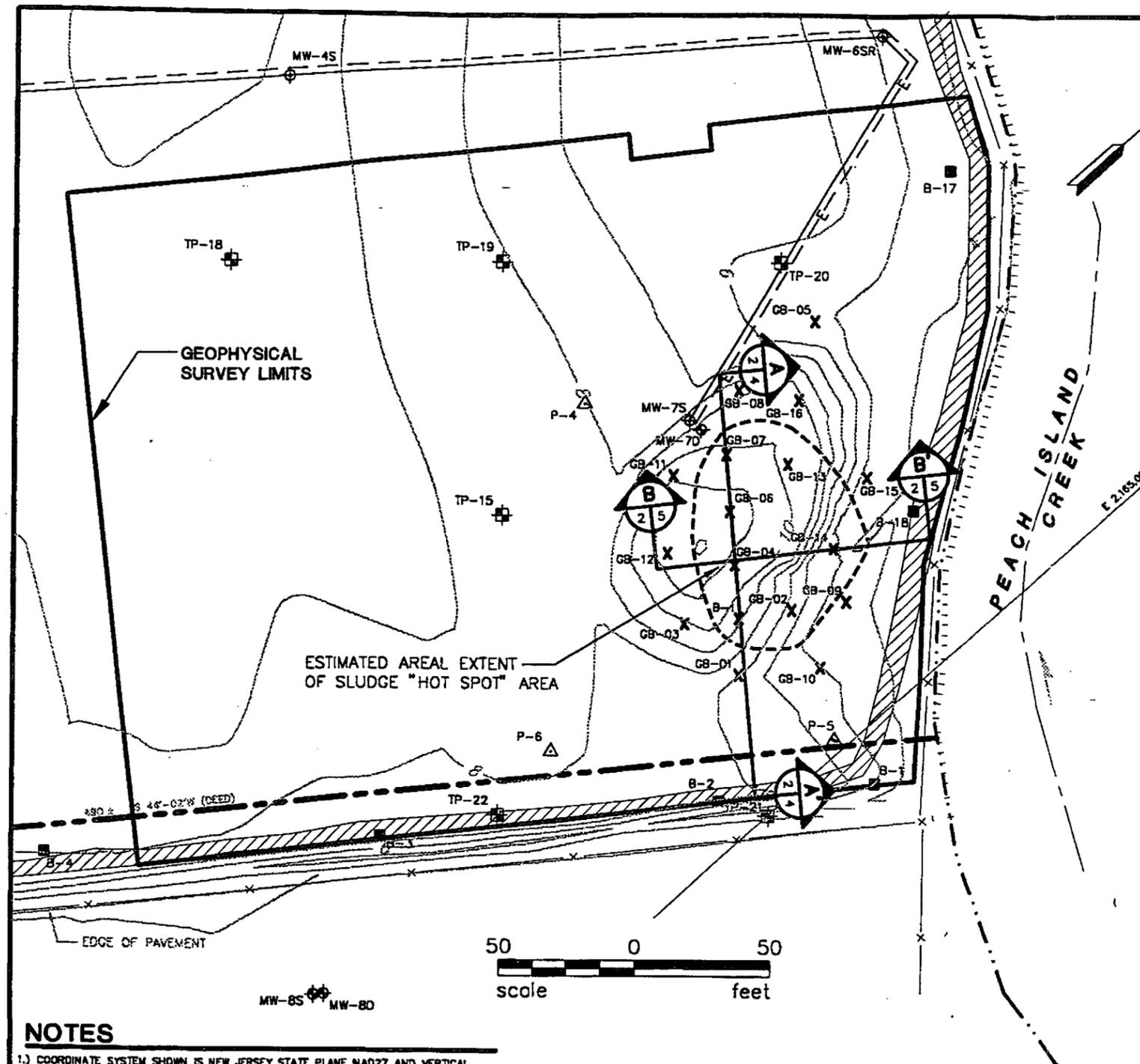
| | | | |
|----------|--------------------|--------------|----------|
| JOB No.: | 943-6222 | SCALE: | AS SHOWN |
| DR BY: | DWD | DATE: | 10/14/97 |
| CHK BY: | <i>So m</i> | FILE No.: | NJ03-775 |
| REV BY: | <i>[Signature]</i> | DR SUBTITLE: | 13 |

GEOLOGICAL CROSS SECTION B-B'

Golder Associates

216 PATERSON PLANK ROAD SITE

FIGURE **5**



LEGEND

- DETAIL OR CROSS SECTION DESIGNATION
- FIGURE No. WHERE DETAIL OR CROSS SECTION IS PRESENTED
- FIGURE No. WHERE LOCATION OF DETAIL OR CROSS SECTION IS SHOWN
- GB-01 SOIL BORING LOCATION (COMPLETED AS PART OF THE FFS INVESTIGATION)
- MW-80 EXISTING MONITORING WELL (INSTALLED DURING THE REMEDIAL INVESTIGATION)
- P-4 SHALLOW PIEZOMETER (INSTALLED DURING THE REMEDIAL INVESTIGATION)
- MW-4S EXTRACTION WELL (INSTALLED DURING THE REMEDIAL INVESTIGATION AND RETROFITTED FOR SHALLOW GROUNDWATER EXTRACTION AS PART OF THE IRM CONSTRUCTION)
- B-6 SLURRY WALL CONSTRUCTION INVESTIGATION BORING (INSTALLED DURING REMEDIAL DESIGN)
- TP-2 TEST PIT (INSTALLED DURING TEST PIT INVESTIGATION)
- PROPERTY/RIGHT-OF-WAY BOUNDARIES
- 1 FT. CONTOUR LINE (FT. - MSL)
- EDGE OF STREAM
- FENCE
- SLURRY WALL ALIGNMENT
- SHEET PILE WALL ALIGNMENT

NOTES

- 1.) COORDINATE SYSTEM SHOWN IS NEW JERSEY STATE PLANE NAD27 AND VERTICAL DATUM BASED ON NAVD 1929.
- 2.) LOCATION OF SLURRY WALL INVESTIGATION BORINGS AND TEST PIT LOCATIONS ARE APPROXIMATE. BORING & TEST PIT LOCATIONS WERE PREVIOUSLY SURVEYED USING A SITE SPECIFIC COORDINATE SYSTEM.

REFERENCE

- 1.) TOPOGRAPHIC DATA AND SURFACE FEATURES BASED ON INFORMATION BY TAYLOR, WISEMAN & TAYLOR CONSULTING ENGINEERS/SURVEYORS/PLANNERS/LANDSCAPE ARCHITECTS, MOUNT LAUREL, NEW JERSEY, DATED 06/12/92, SCALE 1"=40'.
- 2.) MONITORING WELLS, PIEZOMETERS, AND EXTRACTION WELLS SURVEYED BY GEOO CORPORATION, NEWFOUNDLAND, NJ IN OCTOBER 1996 AND SOIL BORINGS IN AUGUST 1987.
- 3.) SLURRY WALL BORINGS AND FEATURES FROM THE INTERIM REMEDIAL MEASURES TAKEN FROM CANONIE ENVIRONMENTAL, 1992 "INTERIM REMEDY FOR FIRST OPERABLE UNIT", AUGUST 1992.
- 4.) DAMES & MOORE, 1990, "FINAL REPORT - REMEDIAL INVESTIGATION SCP SITE, CARLSTADT, NEW JERSEY", MARCH 1, 1990.
- 5.) DAMES & MOORE, 1989, - "TEST PIT INVESTIGATION SCP / CARLSTADT JULY 1989 CARLSTADT, NEW JERSEY", AUGUST 4, 1989.

| | | | |
|----------|------------|--------------|----------|
| JOB No.: | 943-6222 | SCALE: | AS SHOWN |
| DR BY: | DWD | DATE: | 11/21/97 |
| CHK BY: | <i>SDM</i> | FILE No.: | NJ03-746 |
| REV BY: | <i>SDM</i> | DR SUBTITLE: | 13 |

ESTIMATED AREAL EXTENT OF SLUDGE 'HOT SPOT' AREA

Golder Associates

216 PATERSON PLANK ROAD SITE **FIGURE 6**

CONTRACT DOCUMENT ADDENDUM NO. 4

Golder Associates Inc.

The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Telephone (973) 645-1922
Fax (973) 645-1588
www.golder.com



943-6222

ADDENDUM NO. 4

To: K. Sullivan (Code), T. Raap (ENTACT), M. Cody (ECOR), M. Hadar (RECON),
K. Corradino (Compass)

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 4**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Monday, October 8, 2007

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 4 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

- a) The **Bid Due date** of Wednesday, October 10, 2007 at 5:00 p.m. (EST) **remains unchanged**.
- b) Replace Section 00700 "General Conditions", revision 0, in its entirety with the attached revised Section 00700 "General Conditions", revision 1.
- c) Incorporate answers to questions raised by the prospective Bidders.

BIDDER QUESTIONS AND ANSWERS

The following are questions raised by the prospective Bidders, as of October 8, 2007, and responses to these questions are as follows (for continuity purposes questions are numbered and re-printed herein in ***Bold Italics*** with the corresponding response directly following each question):

Q31. "...is it acceptable to email the .pdf copy of our proposal by the 5pm EST deadline on Wednesday with the 2 hard copies delivered first thing Thursday morning?"

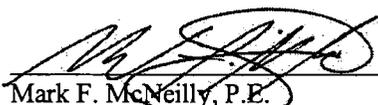
Response #31: Yes.

Q32. "Due to the new information for the stabilization Code is requesting a 1 week extension."

Response #32: Given the current project schedule and the stipulated deliverable due dates incorporated into the Consent Decree for the subject OU-2 Final Remedy, the GROUP is unable to extend the bidding period beyond Wednesday, October 10, 2007.

If anyone has any questions or requires additional information, please feel free to contact the undersigned at (973) 645-1922 (ext. 31303).

PREPARED BY:



Mark F. McNeilly, P.E.
Practice Leader and Associate

SECTION 00700

GENERAL CONDITIONS

These General Conditions, as listed below, amend or supplement the terms, conditions, covenants, requirements, and other provisions stipulated in the executed Construction Agreement. All terms, conditions, covenants, requirements, and provisions, which are not so amended or supplemented, shall remain in full force and effect.

GC-1. DEFINITIONS

- A. See Section 01015 of the Specifications for meanings and definitions of various common terms used throughout and incorporated into the Contract Documents.

GC-2. OWNERSHIP AND USE OF CONTRACT DOCUMENTS

- A. CONTRACTOR shall be furnished five (5) complete copies of the Contract Documents. Additional copies shall be furnished upon request, and at the cost of reproduction.
- B. CONTRACTOR shall have no ownership rights in any of the Contract Documents, including the Contract Drawings and Specifications.
- C. By executing this Contract, CONTRACTOR represents that it has: a) examined the Contract Documents thoroughly; b) visited the Site to become familiar with local conditions that may in any manner affect cost, progress, or performance of the Work; c) become familiar with all federal, state and local laws, ordinances, rules regulations that may in any manner affect cost, progress, or performance of the Work; and d) studied and carefully correlated CONTRACTOR's observations with the Contract Documents.
- D. The Contract Documents comprise the entire Contract between the GROUP and CONTRACTOR concerning the Work. The Contract Documents are complimentary, and what is required by one is as binding as if requested by all.
- E. It is the intent of the Contract Documents to describe a functionally complete Project, or part thereof, to be constructed. Any work, materials, products, or equipment that may reasonably be inferred from the Contract Documents, as being required to produce the intended result, shall be supplied whether or not specified. When words that have a well-known technical or trade meaning are used to describe the Work, materials, products, or equipment, such words shall be interpreted in accordance with that meaning. References to standard specifications, manuals, or codes of any technical society, organization, or association or to the laws or regulations of any governmental authority shall mean the latest standard specification, manual, code, laws, or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated.

- F. The GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall issue such written clarifications and interpretations of the requirements of the Contract Documents, as may be deemed necessary. Such clarifications and interpretations shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.
- G. If, during the performance of the Work, CONTRACTOR finds any conflicts, errors, or discrepancies in the Contract Documents, CONTRACTOR shall immediately report said conflicts, errors, and/or discrepancies to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER in writing. Before proceeding with the Work affected thereby, CONTRACTOR shall obtain a written interpretation or clarification from the REMEDIAL DESIGNER. Any work done before the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER render their decisions is at the CONTRACTOR's sole risk.
- H. If specific means, methods, technique, sequences, or procedures of construction are indicated in or required by the Contract Documents, CONTRACTOR may use a substitute means, methods, sequence, technique, or procedure of construction acceptable to the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, provided CONTRACTOR submits sufficient information to allow the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents, and said substitute proposed is consistent with the remedy described in the Record of Decision.
- I. The GROUP's REPRESENTATIVE shall be allowed a reasonable time, but not less than seven (7) days, to consult with the REMEDIAL DESIGNER to evaluate each proposed substitute. The GROUP's REPRESENTATIVE shall be the final judge of acceptability and no substitute shall be ordered, installed, or used without the GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's prior written acceptance, which shall be evidenced by either a change order or other appropriate documentation. CONTRACTOR may be required to furnish, at the CONTRACTOR's expense, a special performance guarantee or other surety with respect to any substitute.
- J. The GROUP's REPRESENTATIVE shall record the time required by the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the GROUP's REPRESENTATIVE accepts a proposed substitute, CONTRACTOR shall reimburse the GROUP's REPRESENTATIVE for the charges of the GROUP's REPRESENTATIVE, REMEDIAL DESIGNER, and REMEDIAL DESIGNER's consultants for evaluating each proposed substitute.
- K. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed", "as approved", or terms of like effect or import are used or the adjectives "reasonable," "suitable", "acceptable," "proper", or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the GROUP's REPRESENTATIVE and REMEDIAL

DESIGNER as to the Work, it is intended that such requirement, direction, review or judgment shall be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective shall not relieve the CONTRACTOR of its duty and responsibility to supervise or direct the furnishing or performance of the Work.

- L. CONTRACTOR may reproduce and distribute to its employees, SUBCONTRACTORS, vendors, and suppliers all Contract Drawings, Specifications, and data necessary to execute the Work. CONTRACTOR shall assure all of its employees and its SUBCONTRACTORS, vendors, and suppliers work only from the latest revision of issued-for-construction Contract Documents, including Contract Drawings and Specifications. CONTRACTOR shall maintain and make available to the GROUP's REPRESENTATIVE an up-to-date file of all Contract Documents, including all Contract Drawings and Specifications.

GC-3. SUPERVISION AND CONSTRUCTION PROCEDURES

- A. CONTRACTOR and its SUBCONTRACTORS shall not be allowed to perform any Work on-Site without the full-time, on-Site presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL ENGINEER.
- B. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. CONTRACTOR shall be responsible to see that the completed work complies with the Contract Document.
- C. The CONTRACTOR shall be solely responsible for the acts and omissions of the CONTRACTOR's employees, SUBCONTRACTORS, vendors, suppliers, and their representatives, agents, and employees, and other persons performing any of the Work.
- D. CONTRACTOR shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the GROUP, the GROUP's REPRESENTATIVE, or the REMEDIAL DESIGNER by inspections, tests, favorable reviews, or the lack thereof, required or performed by persons other than CONTRACTOR.
- E. CONTRACTOR shall designate in writing a competent full-time resident superintendent, satisfactory to the GROUP and the REMEDIAL DESIGNER, to supervise and direct the Work, and this superintendent shall be on-Site at all times during working hours with full authority to act on behalf of CONTRACTOR. CONTRACTOR shall also provide an adequate staff for the proper coordination and expediting of its work. Should, in the opinion of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, any language barrier exist between the superintendent and the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, CONTRACTOR will, at its own expense, employ a qualified interpreter.

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- F. CONTRACTOR's designated superintendent shall not be replaced without advance written notice to and approved by the GROUP's REPRESENTATIVE. CONTRACTOR shall provide a management chart and a list of personnel comprising the superintending staff and their areas of responsibility. All written communications given to the superintendent or the superintending staff shall be as binding as if given to the CONTRACTOR.
- G. The superintendent shall remain on-Site not less than eight (8) hours-per-day, five (5) days-per-week until termination of the Contract in accordance with the Contract Documents, unless the Work is suspended or stopped by the GROUP or the GROUP's REPRESENTATIVE. The superintendent shall not be employed or used on any other project during the course of the Work.
- H. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction, as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons, work, or property at the Site or adjacent thereto and except as otherwise indicated in the Contract Documents, all Work at the Site shall be performed during regular working hours and the CONTRACTOR shall not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without the GROUP's REPRESENTATIVE's written consent given after at least forty-eight (48) hours prior written notice.
- I. CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment, and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, startup and completion of the Work.
- J. All work shall be performed in a skillful, professional, and workmanlike manner.
- K. CONTRACTOR shall at all times enforce strict discipline and good order among the CONTRACTOR's employees and shall not employ any unfit person or anyone not skilled in the task assigned to him/her. The GROUP's REPRESENTATIVE may, in writing, require CONTRACTOR to remove from the Project any employee it deems incompetent, careless, or otherwise objectionable.

GC-4. SUBCONTRACTS

- A. Unless specifically permitted otherwise, CONTRACTOR shall perform with its own organization and with the assistance of workmen under its immediate superintendence Work amounting to not less than fifty-one-percent (51%) of the total Contract value.
- B. CONTRACTOR shall not employ any SUBCONTRACTOR, supplier, vendor, or other person(s) or organization(s) against whom the GROUP and/or the GROUP's REPRESENTATIVE may have reasonable objection. CONTRACTOR shall not be required to employ any SUBCONTRACTOR, supplier, vendor, or other person(s) or organization(s) to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

- C. CONTRACTOR shall not execute an agreement with any SUBCONTRACTOR, vendors, and/or suppliers or permit any SUBCONTRACTORS, vendors, or suppliers to perform any work included in this Contract until the GROUP has approved said SUBCONTRACTOR in writing.
- D. When the Contract Documents require the identity of certain SUBCONTRACTORS, suppliers or other persons or organizations, including those who are to furnish the principal items of materials, products, and equipment, to be submitted for acceptance to the GROUP's REPRESENTATIVE prior to the effective date of the Contract and if the CONTRACTOR has submitted a list thereof in accordance with the Contract Documents, the GROUP's REPRESENTATIVE's acceptance, in writing, of any such SUBCONTRACTORS, supplier, vendors, or other persons or organizations so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. No acceptance by the GROUP of any such SUBCONTRACTOR, supplier, vendor, or other person or organization shall constitute a waiver of any right of the GROUP to reject defective Work.
- E. CONTRACTOR shall be fully and solely responsible to the GROUP for all acts, errors, and omissions of the SUBCONTRACTORS, suppliers, vendors, and other persons and organizations performing or furnishing any portion of the Work under a Contract with CONTRACTOR, just as CONTRACTOR is responsible for the CONTRACTOR's own acts, errors, and omissions.
- F. All work performed for CONTRACTOR by a SUBCONTRACTOR shall be pursuant to an appropriate agreement between CONTRACTOR and the SUBCONTRACTOR that specifically binds SUBCONTRACTOR to the applicable terms and conditions of the Contract Documents. CONTRACTOR shall pay each SUBCONTRACTOR a just share of any insurance moneys received by the CONTRACTOR on account of losses under policies issued.
- G. Nothing contained in the Contract Documents is intended to create, nor shall it create, any contractual relationship between the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL ENGINEER, or any of their agents, employees, or representatives and any SUBCONTRACTOR.

GC-5. OTHER CONTRACTS

- A. The GROUP reserves the right to issue or enter into other Contracts in connection with this Work. CONTRACTOR shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and/or coordinate its work with theirs.
- B. The GROUP may award, or may have awarded other Contracts for additional work, and CONTRACTOR shall cooperate fully with such other Contractors, by scheduling its Work with that to be performed under other Contracts, as may be directed by the GROUP. CONTRACTOR shall not permit or commit any act, which will interfere with the performance of Work by any other Contractor, as scheduled.

- C. Wherever Work being done by other Contractors is contiguous to Work covered by this Contract, the respective rights of the various interests involved shall be established by the GROUP's REPRESENTATIVE to secure the completion of the various portions of the Work in general harmony.

GC-6. FITTING AND COORDINATION OF THE WORK

- A. CONTRACTOR shall be responsible for the proper fitting of all Work and for the coordination of the operations of all trades, SUBCONTRACTORS, vendors, suppliers, and labor forces engaged on this Contract. CONTRACTOR shall be prepared to guarantee to each of its SUBCONTRACTORS the locations and measurements, which they may require for the fitting of their Work to all surrounding Work.
- B. CONTRACTOR shall, at its own expense, effect all cutting, fitting, or patching of its work required to make the same conform to the Contract Drawings and Specifications, and except with the consent of the GROUP, not to cut or otherwise alter the Work of any other Contractor(s).

GC-7. RESPONSIBILITY OF CONTRACTOR

- A. If, through acts or neglect on the part of CONTRACTOR, any other Contractor or SUBCONTRACTOR suffers a loss or damage in connection with the Work, CONTRACTOR shall settle with such other Contractor or SUBCONTRACTOR by agreement or arbitration.
- B. If such other Contractor or SUBCONTRACTOR asserts any claim against the GROUP on account of any damage alleged to have been so sustained during performance of the Work, the GROUP will notify CONTRACTOR, who shall defend at its own expense any suit based upon such claim, and in any judgment or claims against the GROUP shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and will in all other respects, including, but not limited to, attorney's fees and court costs, hold harmless the GROUP and REMEDIAL DESIGNER.

GC-8. CONSTRUCTION PROGRESS SCHEDULES

- A. CONTRACTOR shall (unless a Pre-Award Construction Progress Schedule has been submitted and approved by the GROUP) prepare and submit within seven (7) calendar days following execution of this Agreement a realistic, detailed Construction Progress Schedule for review and approval by the GROUP, which shows the Contractors proposed sequence of construction and includes start/finish dates and durations for each and every planned construction activity, as specified by the Contract Documents.
- B. Construction Progress Schedules shall include (at a minimum):
 - 1) The project name, number, and geographic location;

- 2) The Contract time, commencement date, completion date, and periods of shutdown, if any;
 - 3) Listings of all Work items with periods of activity for Work segment; and
 - 4) The total estimated Contract cost for each Work segment, and its percentage of the total Contract cost.
- C. *“Requests for Payment”* will not be processed or approved for payment until such time updated Construction Progress Schedules are submitted to and approved by the GROUP’s REPRESENTATIVE.
- D. CONTRACTOR shall reviewed or updated said Construction Progress Schedule on a bi-weekly basis (i.e., every 2 weeks), unless directed otherwise by the GROUP’s REPRESENTATIVE.
- E. See Section 01041 of the Specification for additional requirements relative to preparation of and submission of all Construction Progress Schedules.

GC-9. PAYMENTS

- A. CONTRACTOR shall submit *“Requests for Payment”* to the GROUP’s REPRESENTATIVE on a monthly basis. Formats and contents of each *“Request for Payment”* shall be established and mutually agreed to, prior to submission of CONTRACTOR’s initial *“Request for Payment”*.
- B. At a minimum, all *“requests for Payment”* shall include, but not be limited to, the following: a) full details, on an item by item basis, as to the Work completed with the requested payment period; b) estimates of the percentage completed for each item, both to date and during the month; and c) amounts invoiced, item by item and totaled, both to date and during the month.
- C. Within thirty (30) consecutive calendar days of receipt of each submitted *“Request for Payment”*, the GROUP’s REPRESENTATIVE will review the submitted *“Requests for Payment”*, and identify, discuss, and resolve all controversial items/issues, if any, with CONTRACTOR, as necessary. If there are no controversial issues/items or said controversial items/issues have be mutually resolved, the GROUP’s REPRESENTATIVE will approve said *“Requests for Payment”*, and issues said *“Requests for Payment”* to the GROUP for payment
- D. Upon approval of each *“Request for Payment”*, the GROUP will pay CONTRACTOR ninety-percent (90%) of the total value for each approved *“Request for Payment”*, and withhold ten-percent (10%) as retainage. The amount of retainage shall in no way limit CONTRACTOR’s liability under this Agreement.
- E. The GROUP shall hold such retainage percentages as security for the faithful performance, by CONTRACTOR, of all conditions, covenants, and requirements specified and provided for in this Contract Agreement. Furthermore, such retainage shall be payable to CONTRACTOR upon: a) the GROUP having received completed and signed Bills Paid Affidavits and Waiver of Liens forms by CONTRACTOR all SUBCONTRACTORS performing portions of the Work; and b) the latter of (i) thirty

(30) consecutive calendar days following Substantial Completion and (ii) delivery to the GROUP of all items required by this Contract.

- F. The GROUP may withhold or decline to pay CONTRACTOR, because of, but not limited to, any of the following reasons:
- 1) Costs of all defective, rejected, or incomplete Work;
 - 2) All damages, losses, or expenses incurred by the GROUP on account of defective, rejected, or incomplete Work or CONTRACTOR's performance of the Work;
 - 3) All claims, demands made, or liens filed by any person or entity against the GROUP, the Work or the Project Site on account of defective or incomplete Work, CONTRACTOR's performance of the Work or failure to pay Subcontractors, laborers, or Suppliers;
 - 4) Failure of CONTRACTOR to make payments to SUBCONTRACTORS, suppliers, and/or vendors;
 - 5) Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price;
 - 6) Damages to the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or other Contractors;
 - 7) Failure to comply with CONTRACTOR's approved Construction Progress Schedule; and
 - 8) Failure to perform the Work in accordance with the Contract documents;

When the circumstances resulting in non-payment to CONTRACTOR are removed to the satisfaction of the GROUP, payment shall be made for amounts withheld because of them.

- G. CONTRACTOR warrants and guarantees that title to all work, labor, materials, and equipment covered by any "*Request for Payment*", whether incorporated in the Project or not, shall pass to the GROUP free and clear of all liens no later than the time of payment.
- H. The GROUP's REPRESENTATIVE shall determine actual quantities and classifications of unit price work performed by CONTRACTOR. The CONTRACTOR shall review the GROUP's REPRESENTATIVE's preliminary determinations of such quantities. The GROUP's REPRESENTATIVE's determination thereof shall be final and binding upon CONTRACTOR unless, within five (5) days after the date of any such decision, CONTRACTOR delivers to the GROUP's REPRESENTATIVE written notice of its intention to appeal the determination.
- I. With each "*Request for Payment*", CONTRACTOR and each of its lower tier SUBCONTRACTORS, suppliers, and vendors seeking payment, must provide completed Bills Paid Affidavit and Waiver of Liens forms. See Section 00310 of the Specifications for the Bills Paid Affidavit and Waiver of Liens form.
- J. Receipt, by the GROUP's REPRESENTATIVE, of all completed Bills Paid Affidavit and Waiver of Liens form shall be a condition precedent to payment of any "*Requests for Payment*", and the thirty (30) day time period for payment will not commence

until the GROUP has received said completed Bills Paid Affidavit and Waiver of Liens forms from all parties seeking payment under each “*Request for Payment*”.

GC-10. CHANGES IN THE WORK

- A. The GROUP may make changes in the Work, as required to be performed by CONTRACTOR under this Contract, by making additions thereto, or by omitting Work therefrom, without invalidating the Contract.
- B. Except for the purpose of affording protection against any emergency endangering life or property, CONTRACTOR shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of this Contract, unless in pursuance of a written order from the GROUP authorizing CONTRACTOR to proceed with the change. No claim for an adjustment of the Contract price will be valid unless so ordered.
- C. CONTRACTOR agrees to perform any of the aforementioned changed work, along with all other required work found under the Contract, without delay and in accordance with good construction practices.
- D. The changes outlined above may be made without relieving or releasing CONTRACTOR from any of its obligations under the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is provided otherwise.
- E. If applicable unit prices are contained in the Agreement (established as a result of either a Unit Price Bid or a Supplemental Schedule of Unit Prices), the GROUP may order CONTRACTOR to proceed with desired changes in the work, the value of such change to be determined by the measured quantities involved and the applicable unit prices specified in the Contract.
- F. If applicable unit prices are not contained in the Agreement, the GROUP will, before ordering CONTRACTOR to proceed with desired changes, request an itemized proposal from CONTRACTOR covering the Work involved in the change after which the procedure shall be as follows:
 - 1) If the change in the Work involves additional Work, the procedure shall be as follows:
 - a. If the proposal is acceptable, the GROUP will prepare a Change Order in accordance therewith for acceptance by CONTRACTOR; or
 - b. If the proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the GROUP may order CONTRACTOR to proceed with the Work on a Cost-Plus-Limited Basis. A Cost-Plus-Limited Basis is defined as the net cost of the Work to CONTRACTOR plus an allowance to cover overhead and profit, as stipulated below, the total cost not to exceed a

specified amount. The following allowances for overhead and profit are hereby established as reasonable and shall apply:

- i. Fifteen-percent (15%) of the net cost of all labor furnished by CONTRACTOR. For all labor CONTRACTOR shall receive the rate of wage actually paid, as shown by its certified payroll. For all foremen in direct charge of the work, CONTRACTOR shall receive the actual wage paid the foremen, as shown on its certified payroll. No part of the salary or expense of anyone above the grade of foreman and having general supervision of the Work will be included in the labor item.
 - ii. In the case of extra Work by a SUBCONTRACTOR, the SUBCONTRACTOR shall compute its cost for the extra Work, to which it shall add fifteen-percent (15%) maximum and CONTRACTOR shall be allowed an additional five-percent (5%) of the SUBCONTRACTOR's costs for the extra Work.
 - iii. For the cost of all insurance and taxes imposed by law on labor employed on the Work, CONTRACTOR shall receive the actual amount paid.
 - iv. Ten-percent (10%) of the net cost of all materials used by CONTRACTOR, less any allowable cash or early payment discounts, delivered on the Work, including delivery charges, as shown by original receipted bills.
 - v. Rental rates for any power operated machinery, trucks, or equipment, which it may be found necessary to use on Cost-Plus-Limited work shall be negotiated between the GROUP and CONTRACTOR. These rates shall be reasonable and shall be based on those rental rates prevailing in the area where such Work is to be done, and they shall be agreed upon in writing before the Work is begun. In no case shall the rental rates exceed the rates set up in the current edition of the "Associated Equipment Distributors Compilation of Rental Rates" and shall include all repairs, fuel, lubricants, taxes, insurance, depreciation, storage and all attachments complete, ready to operate, but excluding operators. Operators and oilers (i.e., tenders) shall be paid as stated hereinabove for labor.
 - vi. No percentage for overhead and profit shall be added to the amounts of equipment rental prices agreed upon, but the price agreed upon shall be the total compensation allowed for use of such equipment.
 - vii. All disputes regarding Work performed on a Cost-Plus-Limited Basis under this section are subject to the appeal procedures outlined in the General Condition GC-54.
- 2) If changes in the Work requires a reduction in the Work involved, the procedure shall be as follows:

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- a. If the proposal is acceptable, the GROUP will prepare a Change Order in accordance therewith for acceptance by CONTRACTOR; or
- b. If the proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the GROUP's REPRESENTATIVE will fix the cost value of the credit. The GROUP may then order CONTRACTOR to proceed with the work through a Change Order. Should CONTRACTOR disagree with the cost value of the credit as fixed by the GROUP's REPRESENTATIVE, it may appeal the same in accordance with the procedures outlined in the General Condition GC-54.

G. Each Change Order shall include in its final form:

- 1) A detailed description of the change in the work;
- 2) CONTRACTOR's proposal (if any) or a confirmed copy thereof;
- 3) Definite statements as to the resulting change in the Contract price and/or time; and
- 4) Statement that all Work involved in the change shall be performed in accordance with Contract requirements, except as modified by the Change Order.

H. CONTRACTOR shall not take advantage of any obvious errors in the specifications or any such error in the Contract Drawings or other Contract Documents. Any obvious errors or discrepancies in or between any of the Contract Documents shall be immediately reported to the GROUP's REPRESENTATIVE, who will make such corrections and interpretations as may be deemed necessary for the completion of the Work in a satisfactory and acceptable manner.

GC-11. CHANGES IN SUBSURFACE CONDITIONS

- A. In the event CONTRACTOR, during the process of the Work, encounters conditions which materially differ from those shown on or implied on the Contract Drawings or in the Specifications, or those determined during Contractor's inspection of the Site, prior to the Bid, and further, if these changed conditions cause a loss to CONTRACTOR, CONTRACTOR shall be entitled to submit a request for additional compensation in accordance with of the General Condition GC-12.
- B. CONTRACTOR shall not be entitled to submit a request for additional compensation for changed conditions that vary seasonally, including but not limited to groundwater fluctuations, freezing/frost, etc.
- C. Changed existing utility locations from those shown or implied by the Contract Drawings shall be the basis for a claim except as provided under General Condition GC-42.
- D. Notice of any changed conditions must be given to the GROUP's REPRESENTATIVE as soon as the event occurs, so that the GROUP's REPRESENTATIVE will have an opportunity to investigate the same and make any alterations, which in the discretion of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER may be necessary. Such notice is a material condition, which must be adhered to by CONTRACTOR.

- E. Prior to the GROUP's REPRESENTATIVE giving any consideration to CONTRACTOR's request for additional compensation, CONTRACTOR shall be obligated to submit a detailed description of such changes.
- F. The REMEDIAL DESIGNER will investigate the facts and will notify the GROUP whether the actual conditions encountered by CONTRACTOR are or are not materially different from those shown or implied on the Contract Drawings and in the Specifications.
- G. In the event of a favorable decision by the GROUP, CONTRACTOR shall be entitled to additional compensation and the amount of the additional compensation shall be determined in accordance with the provisions of the General Condition GC-12.
- H. In the event of any unfavorable decision by the GROUP, CONTRACTOR shall have the rights to contest said decision as provided for under the provisions of this Contract.

GC-12. CLAIMS FOR ADDITIONAL COSTS AND/OR TIME

- A. All claims between the parties, including all claims for additional compensation and/or additional time, arising out of, or in any way related to this Contract and/or the performance of the same, or its interpretation, except those disputes covered by Federal Labor Standards Provisions shall within ten (10) days of the event or action giving rise to such claims be presented to the GROUP's REPRESENTATIVE. All papers pertaining to such claims shall be filed in triplicate. Such notice need not detail the amount of the claim but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, CONTRACTOR shall proceed with the Work, as directed. Any claim not presented within the time limit specified in this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is to be given within ten (10) days of its commencement, the claim will be considered only for period commencing ten (10) days prior to receipt by the GROUP's REPRESENTATIVE of notice thereof. CONTRACTOR shall in no case allow any claim or dispute to delay the Work.
- B. Within ten (10) days after the initial notice of a claim, as described above, CONTRACTOR shall prepare and submit its claim in final form complete with costs and schedule impacts and all supporting information/data. Should the claim be of a continuing nature, CONTRACTOR shall submitted its claim in final form, as of the last day of each month during its continuance.
- C. As soon as practicable after the final submission of all information the GROUP will make a determination of any submitted claims. Said decision of the GROUP shall be a condition precedent to any further action on the claim. However, upon certification in writing by the claimant that the claim has been submitted in its final form, the GROUP will be obliged to render a decision on said claim within sixty (60) days of the date of said certification. Should the GROUP fail to render its decision within the aforementioned sixty (60) day period, its decision will not be a condition precedent to any further action on the part of the claimant.

- D. There shall be no added compensation paid for delay to CONTRACTOR unless the GROUP causes said delay by material breach of this Contract, and compliance with the foregoing notice provisions shall be a condition precedent to the prosecution of any such claim.
- E. Claims for additional compensation for additional Work, due to alleged errors in ground elevations, contour lines, or benchmarks, will not be considered unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which results, or would result, in handling more material, or performing more Work, than would be reasonably estimated from the Contract Drawings.
- F. If, on the basis of the available evidence, the GROUP determines that an adjustment of the Contract Price and/or time is justifiable, the procedure shall be as provided in General Conditions GC-10, GC-11, GC-12, and GC-13.
- G. In the event of an unfavorable decision by the GROUP, CONTRACTOR shall have the right to contest said decision, as provided for under the provisions of this Contract.

GC-13. TERMINATION, DELAYS AND EXTENSIONS, AND LIQUIDATED DAMAGES

- A. Termination of Contract: For its own convenience the GROUP may, at any time prior to the issuance of a Notice to Proceed (NTP), void this Contract by giving unequivocal and unconditional written notice of such voidance to CONTRACTOR, and in the event of such voidance the GROUP will not be liable to CONTRACTOR for any claims or losses, including anticipated loss of profit and moneys expended in anticipation of performance of the Work specified by this Contract.

At any time subsequent to the NTP, the GROUP may, at its convenience, terminate the Contract by giving unequivocal and unconditional written notice of such termination to CONTRACTOR. In the event of such termination by the GROUP, the GROUP will be responsible to CONTRACTOR for the following moneys only, which moneys shall be subject to legitimate charges of the GROUP against CONTRACTOR:

- 1) All reasonable costs incurred by CONTRACTOR in performance of or in anticipation of performance of the Contract provided CONTRACTOR shall take all reasonable steps to mitigate such damages including the return and/or re-sale of materials ordered; and
- 2) A mark-up of ten-percent (10%) for profit and ten-percent (10%) for overhead on the reasonable cost of the Work completed and in place, in accordance with the Contract Drawings and Specifications, to the date of termination. CONTRACTOR shall remain responsible for the Work completed, in accordance with the Contract provisions.

Should any work under this contract be subject to, or terminated by the action of any third party, governmental unit/body/agency, or court due to any reason, including

environmental or ecological, the rights of CONTRACTOR to recover from the GROUP shall be determined as set forth above.

The GROUP may give notice, in writing, to CONTRACTOR and his surety of any material breach of this Contract by CONTRACTOR to include, but not be limited to, any of the following:

- 1) Failure to begin the Work under this Contract within the time specified;
- 2) Failure to perform the Work with sufficient workmen, equipment, or materials to insure the prompt completion of said Work;
- 3) Unsuitable performance of the Work or failure to perform any additional Work to correct such rejected, defective, or unsuitable Work;
- 4) Neglecting or refusing to remove material rejected, as defective and unsuitable;
- 5) Discontinuing the suitable prosecution of the Work for a period of seventy-two (72) hours, excluding Sundays and holidays, without written authorization from the GROUP's REPRESENTATIVE;
- 6) Failure to commence discontinued Work within forty-eight (48) hours following notice to resume such discontinued Work (excluding Sundays and holidays);
- 7) Becoming insolvent or declared bankrupt, or committing any act of bankruptcy or insolvency;
- 8) Allowing any final judgment to stand against CONTRACTOR unsatisfied for periods equal to or greater than ten (10) calendar days;
- 9) Making any assignment for the benefit of creditors; and
- 10) Violating any terms, conditions, covenants, and/or provisions presented in the Contract Documents.

CONTRACTOR's Surety, within a period of ten (10) calendar days after such notice of default, shall take all appropriate and necessary actions to correct said material breaches of Contract. Should said actions fail to meet with the approval of the GROUP, the GROUP may, at its discretion, order the Surety to complete the Work or, without violating the Contract, take the prosecution of the Work out of the hands of said Contractor and Surety.

The GROUP may appropriate or use any or all materials and equipment on the ground as may be suitable and acceptable and may enter into an agreement, either by negotiation or public letting, for the completion of said Contract according to the terms and provisions thereof, or use such other methods or combinations thereof, as in its opinion will be required or desirable for the completion of said Contract in an acceptable manner. All costs and charges incurred by the GROUP, together with the cost of completing the work under Contract, shall be deducted from any monies due or which may become due to said CONTRACTOR. In case such expense shall exceed the sum which and would have been payable under the Contract, CONTRACTOR and the Surety shall be liable and shall pay to the GROUP the amount of said excess.

- B. Excusable Delays and Extensions of Time: The right of CONTRACTOR to proceed shall not be terminated nor shall CONTRACTOR be charged with liquidated damages for any delays in the completion of the Work due:

- 1) To any acts of the government, including controls or requisitioning of materials, equipment, tools, or by labor, by reason of war, National Defense, or any other national emergency;
- 2) To any acts of the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or agents of the GROUP; or injunction or litigation against the GROUP;
- 3) To causes not reasonably foreseeable by the both parties to this Contract at the time of the execution of this Contract, which are beyond the control and without the fault or negligence of CONTRACTOR, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of some other contract with the GROUP, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions; and
- 4) To any delay of any SUBCONTRACTOR occasioned by any of the causes specified above.

If CONTRACTOR believes it has experienced an excusable delay and requests and extension of time, CONTRACTOR shall promptly notify the GROUP in writing within ten (10) days of CONTRACTOR becoming knowledgeable of such delays, and show appropriate cause for such delays. Upon receipt of such notification and all necessary supporting data, the GROUP will ascertain the facts, causes, and extent of such delays. If, upon the basis of the facts and the terms of this Contract, the delay is properly excusable, the GROUP will extend the time for completing the Work for a period of time commensurate with the period of excusable delay.

No claim for damages or any claim other than for an extension of time and for reimbursement of additional direct costs actually incurred, as a result of such excusable delay, as herein provided shall be made or asserted against the GROUP by reason of any delay.

- C. Liquidated Damages for Delay: If the Work is not completed within the time stipulated in Supplementary Condition SC-1, including any extensions of time for excusable delays, as herein provided, CONTRACTOR shall pay to the GROUP as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) for each calendar day of delay, until the Work is completed, the amount as set forth in Supplementary Condition SC-2, and CONTRACTOR and its sureties shall be liable to the GROUP for the amount thereof.

GC-14. RIGHT TO STOP OR SUSPEND THE WORK

- A. If the Work is defective or if CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment or fails to furnish or perform the Work in such a way that the completed work shall conform to the Contract Documents, the GROUP's REPRESENTATIVE may order CONTRACTOR to stop the Work or any portion thereof until the cause for such order has been eliminated. This right of the GROUP to stop work shall not give rise to any duty on the part of the GROUP or the GROUP's REPRESENTATIVE to exercise this right for the benefit of CONTRACTOR or any other party.

- B. The GROUP may at any time and without cause suspend this Contract or any portion thereof for a period of not more than one hundred eighty (180) days by notice in writing to CONTRACTOR that shall fix the date on which Work shall be resumed. CONTRACTOR shall resume Work on the date so fixed, and may be entitled to an extension of the Contract time in accordance General Conditions GC-12 and GC-13.
- C. If the performance of all or part of the Work is suspended for an unreasonable period of time by an act of the GROUP or the GROUP's REPRESENTATIVE or by failure of the GROUP or the GROUP's REPRESENTATIVE to act within the time specified in this Contract, the CONTRACTOR shall be entitled to an equitable adjustment, per the conditions of this Contract. No equitable adjustment shall be allowed for any failures by CONTRACTOR, including failure of supervision, which subsequently resulted in the Work being suspended.
- D. No claims for an equitable adjustment shall be allowed for: 1) any costs incurred prior to the date CONTRACTOR was notified by the GROUP in writing of the act or failure to act involved, but this requirement shall not apply as to a claim resulting from a suspension order; 2) any claim for an extension of time required for performance, unless within twenty (20) days after the act or failure to act involved, CONTRACTOR submits to the GROUP a written statement setting forth, as then practicable the extent of such claimed time extension; and 3) unless the claims for a time extension in an amount stated are asserted in writing within twenty (20) days after the end of such suspension, delay, or interruption.

GC-15. ASSIGNMENT OR NOVATION

- A. CONTRACTOR shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the GROUP; provided, however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the GROUP. In the event of any assignments made to banks, trust companies, or other financial institutions, CONTRACTOR shall provide written notice to the GROUP.
- B. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of CONTRACTOR's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered and materials, tools, and equipment supplied for the performance of the Work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

GC-16. GROUP'S REPRESENTATIVE AND REMEDIAL DESIGNER'S AUTHORITY

- A. The GROUP's REPRESENTATIVE will decide all non-technical questions, which may arise in relation to the Work and construction thereof, and the REMEDIAL DESIGNER will decide all technical questions, which may arise in relation to the Work and the construction thereof.

- B. The GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's estimates, interpretations, and decisions shall be final and conclusive, except as herein otherwise expressly provided.
- C. In case any question shall arise between the parties hereto relative to said Contract, the determination or decision of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall be a condition precedent to the right of CONTRACTOR to receive any money or payment for work under this Contract affected in any manner or to any extent by such question.

GC-17. TECHNICAL SPECIFICATIONS AND CONTRACT DRAWINGS

- A. Anything mentioned in the Technical Specifications and not shown on the Contract Drawings or shown on the Contract Drawings and not mentioned in the Technical Specifications shall be of like effect, as if shown on or mentioned in both.
- B. In cases of difference between the Contract Drawings and Technical Specifications, the Technical Specifications shall govern.

GC-18. SHOP DRAWINGS

- A. All required shop drawings, machinery details, layout drawings, working drawings, material, and equipment descriptions, etc., shall be submitted to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, in four (4) copies, for review sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. CONTRACTOR shall allow four (4) weeks for checking from the date of receipt by the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.
- B. CONTRACTOR, with the approval of the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, may submit manufacturer's literature as a substitute for, or supplement to, the requisite shop drawings, etc. The minimum size for any submission shall be 8-1/2" x 11" and the maximum size shall be the size of the Contract Drawings. All shop drawings, etc. and/or printed matter submitted shall be properly identified by project and specific application with reference to Contract Drawing number and specification items.
- C. No construction, purchase, delivery, installation, or Work shall be done or made on any part or feature of this Contract, which is dependent upon shop drawing review, until such review has been received from the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. If CONTRACTOR proceeds without reviewed shop drawings, it shall be at its own risk. No claim by CONTRACTOR, for extension of the Contract time will be granted by reason of its failure in this respect.
- D. Shop drawings, etc., or printed matter shall give all dimensions, sizes, etc. to enable the REMEDIAL DESIGNER to determine suitability of the construction, installation, material or layout for the purposes intended. Where needed for clarity, the drawings shall include outline, sectional views and detailed working dimensions and

designations of the kind of material, machine work, finish, etc., required. The drawings to be submitted shall be coordinated by CONTRACTOR with any other drawings previously reviewed, with the design and function of any equipment or structure and the Contract Drawings.

- E. Any shop drawings, etc., submitted without CONTRACTOR's stamp of approval will not be considered and will be returned to CONTRACTOR for proper resubmission. By approving and submitting shop drawings, etc., CONTRACTOR thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so and that he has checked and coordinated each shop drawing, etc. with the requirements of the work and of the Contract Documents.
- F. If any drawings show variations from the requirements of the Contract because of standard shop practice and/or other reasons, CONTRACTOR shall make specific mention of such variation in its letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of the contract price and/or time; otherwise, CONTRACTOR will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been reviewed.
- G. After review, the submittals will be stamped "No Exceptions Taken", "Make Corrections Noted", "Amend-Resubmit", or "Rejected-Resubmit". Drawings marked "No Exceptions Taken" and "Make Corrections Noted" will be returned to CONTRACTOR for its use and distribution to his suppliers and/or Subcontractors. In the case of those stamped "Amend-Resubmit" or "Rejected-Resubmit", two (2) prints will be returned to CONTRACTOR who shall make all indicated corrections and resubmit four (4) new copies of the revised submittal.
- H. In any submission that is noted as "No Exceptions Taken" or "Make Corrections Noted", the review shall not extend to details or dimensions and shall not relieve CONTRACTOR from his responsibility for compliance with the Contract Drawings and Specifications.
- I. When CONTRACTOR proposes a revision to a previously submitted shop drawing, etc., four (4) copies shall be resubmitted for review. This re-submittal shall clearly indicate, in a revision block, the date, description, and location of the revision. The letter of transmittal shall state the reasons for the revision.
- J. CONTRACTOR shall furnish as many copies of the submittals, as is necessary for the proper coordination of the work, and shall maintain a complete set of the reviewed submissions at the Site of the Work at all times.
- K. Upon the final acceptance of the project, CONTRACTOR shall furnish the GROUP, at the GROUP'S option, with a complete set of shop drawing tracings and/or reproducible cloth reproductions of the shop drawing tracings.
- L. There will be no direct payment made for any of the above submittals, or reproducible drawings if required, but the cost thereof shall be considered as included in the general cost of the work.

- M. See Section 01300 of the specification for additional requirements.

GC-19. REQUESTS FOR SUPPLEMENTARY INFORMATION

- A. It shall be the responsibility of CONTRACTOR to make timely requests of the GROUP for any additional information not already in its possession which should be furnished by the GROUP under the terms of this Contract, and which it will require in the planning and execution of the work. Such requests may be submitted from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.
- B. Each request shall be in writing, and list the various items and latest date by which each will be required by CONTRACTOR. The first list shall be submitted within two (2) weeks after Contract award, and shall be as complete as possible at that time. CONTRACTOR shall, if requested, furnish promptly any assistance and information the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER may require in responding to these requests for supplementary information.
- C. CONTRACTOR shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this General Condition.

GC-20. MATERIALS AND WORKMANSHIP

- A. Unless otherwise specifically provided for in the Specifications, all workmanship, equipment, materials and articles incorporated in the Work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles, or workmanship are referred to in the Specifications as "equal to" or "equivalent to" any particular standard, the REMEDIAL DESIGNER will solely decide the question of equality.
- B. All work performed and all materials furnished shall be in conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances shown on the Contract Drawings or indicated in the Specifications.
- C. CONTRACTOR shall furnish to the GROUP for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work.
- D. Machinery, mechanical and other equipment, materials, or articles installed or used without such prior approval shall be at the risk of subsequent rejection.
- E. Materials specified by reference to the number or symbol of a specific standard, such as an ASTM Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement

thereto in effect on the date of the Request for Bids, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as modified in the Specifications, shall have full force and effect, as though printed therein.

- F. CONTRACTOR shall employ only competent and skillful personnel to do the Work. Whenever the GROUP's REPRESENTATIVE notifies CONTRACTOR, in writing, that any person on-Site is, in its opinion, incompetent, unskillful or disorderly, CONTRACTOR shall forthwith remove such person and shall not again employ him/her on any part of the Work without the written consent of the GROUP'S REPRESENTATIVE. In no event shall notifications (or lack thereof) of the GROUP'S REPRESENTATIVE under this section modify or alleviate CONTRACTOR'S obligation to employ only competent and skillful personnel to do the Work
- G. The GROUP may stop any Work or any part of the Work under the Contract, if the GROUP believes that methods or conditions are such that unsatisfactory Work might result, if improper materials or workmanship is being used, or if unsafe conditions exist or will be created.
- H. In the event the materials furnished or the Work performed deviates from the requirements of the Contract Drawings and Specifications, but, in the opinion of the GROUP, constitutes substantial performance, the GROUP may accept the same. Should the deviation in question result in a savings to CONTRACTOR the GROUP will be entitled to a credit in the full amount of said savings. Should the deviation in question result in additional costs to CONTRACTOR, the GROUP will not be liable to CONTRACTOR for such additional cost.
- I. If the materials or the finished product in which the materials are used or the work performed are not in conformity with the Contract Drawings and Specifications and have resulted in an inferior or unsatisfactory product, the Work and materials shall be removed and replaced or otherwise corrected by and at the expense of CONTRACTOR.

GC-21. SAMPLES, CERTIFICATES, AND TESTS

- A. CONTRACTOR shall submit all samples, materials, certified test reports, materials certificates, certificates of compliance, affidavits, etc., as called for in the Contract Documents or required by the REMEDIAL DESIGNER, promptly after award of the Contract and acceptance of CONTRACTOR's bonds. No such materials and/or equipment, etc., shall be manufactured or delivered to the Site, except at CONTRACTOR's own risk, until the required samples, certificates, tests, etc., have been approved in writing by the REMEDIAL DESIGNER. Any delays in the Work caused by late or improper submission of the above for approval shall not be considered just cause for an extension of the Contract time.
- B. Samples: Unless otherwise specified, CONTRACTOR shall furnish the required samples without charge, and shall provide every facility for the securing of material samples. CONTRACTOR shall provide means and assist in the verification of all scales, measures, and other devices that it operates. Samples to be submitted will be taken by the REMEDIAL DESIGNER or a laboratory approved by the GROUP, unless

otherwise specified. All materials being used shall be subject to re-sampling and testing at any time during their preparation and/or use.

- C. All samples submitted by CONTRACTOR shall be properly identified to include, but not be limited to, the project name, project number, item number, and description of material, name of the producer, place of origin, and other detailed information which will assist the REMEDIAL DESIGNER passing upon the acceptability of the sample. Certified test reports, materials certificates and/or certificates of compliance required to be submitted with the samples or if permitted in lieu of samples, shall conform to the requirements stated hereafter.
- D. Certified Test Reports: A certified test report shall be a document containing a list of the dimensional, chemical, metallurgical, electrical, and physical results obtained from an actual test of the materials involved, and shall certify that the materials meet the requirements of the Contract Drawings and Specifications, and at a minimum shall also include the following information:
- 1) Item number and description of material;
 - 2) Date of manufacture;
 - 3) Date of testing;
 - 4) Name of organization to whom the material is consigned;
 - 5) Quality of material represented, such as batch, lot, group, etc.;
 - 6) Means of identifying the consignment, such as label, marking, lot number, etc.;
 - 7) Date and method of shipment; and
 - 8) Name of organization performing tests.

Certified test reports shall be signed by an authorized and responsible agent for the organization manufacturing the material, and they shall be duly notarized.

- E. Material Certificates: Material certificates shall be documents certifying that the materials, components, and equipment furnished, conform to all requirements of the Contract Drawings and Specifications. At a minimum, said material certificates shall include the following information:
- 1) Project to which the material is consigned;
 - 2) Name of Contractor to whom material is supplied;
 - 3) Item number and description of material;
 - 4) Quantity of material represented by the certificate;
 - 5) Means of identifying the consignment, such as label, marking, lot numbers, etc.;
and
 - 6) Date and method of shipment.

Material certificates shall be signed by an authorized and responsible agent for the organization supplying the material, and they shall be duly notarized.

- F. Certificates of Compliance: A certificate of compliance shall be a document certifying that the materials, components, and equipment covered by the previously submitted certified test report and materials certificate have been installed in the work, and that

they conform to all the requirements of the Contract Drawings and Specifications. At a minimum, the following information shall also be required on these documents:

- 1) Project number;
- 2) Item number and description of material;
- 3) Quantity represented by the certificate; and
- 4) Name of manufacturer.

Certificates of compliance shall be signed by an authorized and responsible agent for the prime Contractor, and shall be duly notarized.

- G. Tests: Tests, as required by the Specifications, will be made in accordance with standards in effect at the time of bidding, unless otherwise specified on the Contract Documents. Representative preliminary samples of the material proposed for use shall be submitted, without charge, by CONTRACTOR or producer for examination and tested in accordance with specified methods. All materials being used are subject to test or rejection at any time during their preparation and use. Materials will be rejected by the REMEDIAL DESIGNER whenever, in his judgment, they fail to meet the requirements of the specifications. The GROUP reserves the right to retest all materials which have been tested and accepted at the source of supply, after the same have been delivered, and to reject all materials which, when retested, do not meet the requirements of the specifications.
- H. Approval/Acceptance: Approval of any materials shall be general only and shall not constitute a waiver of the GROUP's right to demand full compliance with Contract requirements. After actual deliveries, the REMEDIAL DESIGNER will have such check tests made, as it deems necessary, in each instance and may reject materials and equipment and accessories that fail to meet any check tests may cause their removal and replacement by proper materials or demand and secure such reparation by CONTRACTOR as is equitable.
- I. The REMEDIAL DESIGNER may accept a material or combination of materials and therefore waive non-complying test results provided that all of the following conditions are met:
- 1) Results of prior and subsequent series of tests of the material or materials from the same source or sources are found satisfactory;
 - 2) Incidence and degree of nonconformance with the specification requirements are, in the REMEDIAL DESIGNER's judgment, within reasonable and practical limits;
 - 3) CONTRACTOR has diligently exercised material controls consistent with good practices in the REMEDIAL DESIGNER's judgment; and
 - 4) No adverse effect on the value or serviceability of the completed Work could result.
- J. The REMEDIAL DESIGNER may, at his discretion, waive testing of minor quantities of material when such material is obtained from sources that have previously and consistently met specification requirements as demonstrated by testing.

K. Sample, Certificate, and Test Costs:

- 1) CONTRACTOR shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the REMEDIAL DESIGNER, and CONTRACTOR shall pay all other testing costs of said samples;
- 2) CONTRACTOR shall assume all costs of retesting materials which fail to meet Contract requirements; and
- 3) CONTRACTOR shall assume all costs of testing materials offered in substitution for those found deficient or for those specified.

GC-22. PERMITS AND CODES

- A. CONTRACTOR shall obtain and pay for all required permits, approvals, and licenses required for the Work unless already obtained. CONTRACTOR shall pay all government charges and inspection fees necessary for the prosecution of the Work and applicable at the time of opening bids or, if there are no bids, on the effective date of the Contract. CONTRACTOR shall pay all charges of utility owners for connections to the Work. Contractor will notify the GROUP's Representative before seeking any work permits, approvals or licenses.
- B. CONTRACTOR shall give all notices required by and shall observe and comply with all Federal and State laws and Local by-laws, ordinances and regulations in any manner affecting the conduct of the work, and all such orders or decrees as may exist at present and those which may be enacted later, of bodies or tribunals having any jurisdiction or authority over the work.
- C. CONTRACTOR shall indemnify and save harmless the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER and all of their officers, representatives, agents, and servants against any claim or liability arising from or based on the violation of any such law, bylaw, ordinance, regulation, order of decree, whether by its employees.
- D. All construction, work, and/or utility installations shall comply with all applicable ordinances and/or codes including any and all written waivers thereto.
- E. Before commencing any Work, CONTRACTOR shall examine the Contract Drawings and Specifications for compliance with applicable ordinances, codes, etc., and shall immediately report any discrepancy to the GROUP. Where the requirements of the Contract Drawings and Specifications fail to comply with such applicable ordinances, codes, etc., the GROUP will adjust the Contract by Change Order to conform to such ordinances, codes, etc., (unless waivers in writing covering the differences have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.
- F. Should CONTRACTOR fail to observe the foregoing provisions and proceed with the construction of work and/or install any utility at variance with any applicable ordinance, code, etc., including any written waivers (notwithstanding the fact that such installation is in compliance with the Contract Drawings and Specifications),

CONTRACTOR shall remove such work without cost to the GROUP, but a Change Order will be issued to cover only the excess cost CONTRACTOR would have been entitled to receive, if the change had been made before CONTRACTOR commenced Work on the item involved.

- G. Unless otherwise specified, CONTRACTOR shall, at his own expense, secure and pay to the appropriate department of the local, state, and federal government agency fees or charges for all permits including, but not limited to, those required for street pavements, sidewalks, sheds, removal of abandoned water taps, sealing of connection drains, pavement cuts, buildings, electrical plumbing, water, gas, and sewer permits, etc., required by the regulatory body or any of its agencies.
- H. CONTRACTOR shall comply with applicable local, state, federal laws, ordinances, codes, etc., governing the transportation and disposal of surplus excavation, materials debris and rubbish on or off the Site, and commit no trespass on any public or private property in any operation due to or connected with the Work under this Contract.
- I. All non-hazardous samples and by-products from sampling processes in connection with the Work shall be disposed of by CONTRACTOR in accordance with applicable federal, state, and locale rules, regulations, laws, and codes.
- J. Any and all waste materials generated in connection with the Work, including samples and by-products from sampling processes that cannot be introduced back into the environment under applicable law without additional treatment, empty containers, residues, and contaminated media, and all hazardous wastes or radioactive wastes related to the Work, shall be packaged in accordance with applicable law by CONTRACTOR. CONTRACTOR shall identify appropriate alternatives for off-site treatment, storage or disposal of the material at facilities that are, as applicable, approved by EPA and state and local regulatory agencies. The GROUP shall select the final alternative, and CONTRACTOR shall not make any independent determination relating to the selection of a treatment, storage, or disposal facility.
- K. As the GROUP's agent, CONTRACTOR shall provide or subcontract for personnel, equipment and materials required for the transportation of the material to the selected facility. As the GROUP's agent, CONTRACTOR shall comply with all applicable law and shall ensure that, prior to transport, all waste is properly described, packaged, marked and labeled, and is in proper condition for transportation according to all applicable standards and regulations, including without limitations the standards and regulations of the United States Department of Transportation ("DOT"), EPA, and NJDEP. CONTRACTOR shall procure all necessary permits and licenses and other forms of documentation required relating to the waste material to be transported, treated, stored, disposed or processed hereunder. CONTRACTOR shall promptly furnish the GROUP with copies of all such permits, licenses or other documents.
- L. CONTRACTOR shall sign all necessary manifests for the disposal of the material. CONTRACTOR will provide copies of completed manifest documents to the GROUP.

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GC-23. TAXES

- A. CONTRACTOR shall pay all sales, consumer, use, service, excise, payroll, and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the place of the Project that are applicable during the performance of the Work.

GC-24. CARE OF WORK

- A. CONTRACTOR acknowledges that the GROUP is relying upon the accuracy, competence, and completeness of Work rendered under this Agreement.
- B. CONTRACTOR warrants that the Work performed hereunder shall be of good quality, free from material fault or defect; be performed in accordance with, at minimum, the reasonable and customary codes and standards of good practice prevailing in the environmental services industry at the time of performance; be performed strictly in accordance with the RI/FS AOC; be performed by properly qualified and trained personnel; and conform to the specifications of the Contract Documents.
- C. CONTRACTOR warrants that it is familiar with the type of problems typically encountered in performing this type of work, and that Contractor has the capability, experience, and resources to perform the Work in a professional and timely manner consistent with the Contract Documents.
- D. CONTRACTOR shall keep any area where Work is being performed free from unnecessary accumulation of waste materials and rubbish from CONTRACTOR or any Subcontractor, and in a neat and orderly condition.
- E. CONTRACTOR shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the GROUP.
- F. Materials shall be stored so as to insure the preservation of their quality and fitness for the work and shall be located so as to facilitate prompt inspection. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces and not on the ground and, when directed, shall be placed in weatherproof buildings.
- G. Stored materials, even though approved before storage, shall be inspected prior to their use in the work and shall meet the requirements of the specifications at the time it is proposed to use them.
- H. CONTRACTOR shall at his sole expense and without any additional cost to the GROUP provide watchmen and/or other security measures as may be reasonably required to properly protect and care for materials and work completed, and to otherwise prevent property damage and/or personal injury.
- I. In an emergency affecting the safety of life or property, including adjoining property, CONTRACTOR, without special instructions or authorization from the GROUP, is

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authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. CONTRACTOR shall likewise act, if instructed to do so by the GROUP. Any compensation claimed by CONTRACTOR on account of such emergency work will be determined by the GROUP, as provided in General Conditions GC-10 and GC-12.

- J. CONTRACTOR shall avoid damages as a result of its operations to existing sidewalks, streets, curbs, pavements, utilities (except those, if any, which are to be replaced or removed), adjoining property, etc., and shall at his own expense completely repair, in kind, any damage thereto caused by its operations.
- K. CONTRACTOR shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the Site, which may be in any way affected by the excavations or other operations connected with the construction of this Contract.
- L. CONTRACTOR shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. CONTRACTOR shall indemnify and save harmless the GROUP, the GROUP's REPRESENTATIVES, and the REMEDIAL DESIGNER from any damages for which the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER may become liable in consequence of such injury or damage to the Work or adjoining and adjacent structures and/or their premises.

GC-25. ACCIDENT PREVENTION

- A. CONTRACTOR shall exercise proper precautions and safety measures at all times for the protection of persons and/or property and shall be responsible for all injuries and/or damages to all persons and/or property, either on or off the site, which occur as a result of his prosecution of the work under this Contract.
- B. The safety provisions of all applicable local, state, and federal laws, and building and construction codes, shall be observed and CONTRACTOR shall take or cause to be taken such additional safety and health measures as the GROUP may determine to be reasonably necessary.
- C. Machinery, equipment and trucks shall be properly guarded, and operational hazards shall be eliminated in accordance with the provisions and intent of the latest revised edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws.
- D. See General Condition GC-30 and Section 01564 of the Specification for additional Health and Safety requirements.

GC-26. SANITARY FACILITIES

- A. CONTRACTOR shall furnish, install, and maintain ample sanitary facilities for its workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall

be conveniently placed as required by the Health and Sanitary Codes of the local, state, and federal governments.

- B. Drinking water shall also be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health and sanitary regulations.

GC-27. USE OF PREMISES

- A. CONTRACTOR shall confine its equipment, storage of materials, and construction operations to the Contract Limits, as shown on the Contract Drawings and as prescribed by ordinances or permits, or as may be directed by the GROUP, and shall not unreasonably encumber the Site or public “rights-of-way” with its materials and construction equipment.
- B. CONTRACTOR shall comply with all instructions of the GROUP, the GROUP’s REPRESENTATIVE, the REMEDIAL DESIGNER, and the ordinances, codes, etc., of the local, state, and federal governing bodies, regarding signs, advertising, traffic, fires, explosives, danger signals, barricades, etc.

GC-28. REMOVAL OF DEBRIS, CLEANING, ETC.

- A. CONTRACTOR shall, periodically or as directed by the GROUP’s REPRESENTATIVE during the progress of the work, remove and legally dispose of all surplus non-contaminated debris, and keep the Site and public “rights-of-way” reasonably clear.
- B. Upon completion of the work, prior to final inspection, CONTRACTOR shall remove all temporary construction facilities, debris, and unused materials provided for the Work, and put the whole Site and public “rights-of-way” in a neat and clean condition.
- C. The cost of all required debris removal and clean-up shall be included in the various prices bid under this Contract.

GC-29. INSPECTION/ACCEPTANCE OF THE WORK

- A. All materials and workmanship shall be subject to inspection, examination, or testing by the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER to determine the acceptability of the Work at any and all times during manufacture or construction is carried on, and CONTRACTOR shall provide proper facilities for such access and inspection.
- B. The GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER shall have the right to reject defective materials and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be

promptly segregated and removed from the Site, and replaced with materials of specified quality without additional charge/cost to the GROUP.

- C. If CONTRACTOR fails to proceed at once with the correction of rejected workmanship or defective material, the GROUP may by Contract or otherwise have the defects remedied or rejected materials removed from the Site and charge the cost of the same against any monies due or may become due to CONTRACTOR, without prejudice to any rights or remedies of the GROUP.
- D. CONTRACTOR shall furnish promptly all materials reasonably necessary for any tests that may be required. All tests by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER will be performed in such manner as not to delay the Work unnecessarily and shall be made as required by the Specifications.
- E. If the Specifications, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, laws, ordinances, or any public authority require any portion of the Work to be specifically tested and approved, CONTRACTOR shall provide the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER timely notice of its readiness for inspection. If by an authority other than the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER (such as a testing organizations designated by the GROUP), CONTRACTOR shall provide fixed dates for such inspection. If any work should be covered up without approval or consent of the REMEDIAL DESIGNER, it must, if required by the REMEDIAL DESIGNER, be uncovered for examination and properly restored at CONTRACTOR's expense.
- F. CONTRACTOR shall notify the REMEDIAL DESIGNER sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the REMEDIAL DESIGNER, CONTRACTOR shall uncover for inspection and recover such facilities all at its own expense, when so requested by the GROUP's REPRESENTATIVE or REMEDIAL DESIGNER.
- G. Should it be considered necessary or advisable by the REMEDIAL DESIGNER or the GROUP's REPRESENTATIVE at any time before final acceptance of the entire work to make an examination of Work already completed, by uncovering the same, CONTRACTOR shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to meet the requirements of the Contract, payment under the provisions of General Condition GC-10 shall be allowed, and CONTRACTOR shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.
- H. Inspection of materials and appurtenances to be incorporated in the improvements specified under this Contract may be made at the place of production, manufacture, or shipment, whenever the quantity justifies it in the opinion of the REMEDIAL DESIGNER OR GROUP's REPRESENTATIVE, and such inspection and acceptance, unless otherwise stated in the Specifications, shall be final, except as regards: 1) latent defects; 2) departures from specific requirements of the Contract; 3) damage or loss in transit; or 4) fraud or such gross mistakes as amount to fraud. Subject to the

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requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Site.

- I. Neither inspection, testing, approval, nor acceptance of the Work in whole or in part by the GROUP or its agents shall relieve CONTRACTOR or its Sureties of the full responsibility for materials furnished or work performed not in strict accordance with the Contract.

GC-30. REVIEW BY GROUP

- A. The GROUP, its authorized representatives, and agents shall at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however, that all instructions and approval with respect to the Work will be given to CONTRACTOR only by the GROUP through its authorized representatives or agents.

GC-31. FINAL INSPECTION

- A. When the Work specified under this Contract is Substantially Completed, CONTRACTOR shall notify the GROUP's REPRESENTATIVE as to a suitable date for Final Inspection. The notice will be given at least ten (10) days prior to the date stated for Final Inspection, and bear the signed concurrence of the representative of the GROUP having charge of inspection.
- B. If the GROUP determines that the status of the Work is as represented, it will make the arrangements necessary to have Final Inspection commenced on the date stated in the CONTRACTOR's notice, or as soon thereafter as practicable. The inspection party may also include the representative of the Federal Agency, other Governmental Agencies, and representatives of the Local Government.

GC-32. DEDUCTIONS FOR UNCORRECTED WORK

- A. If the GROUP deems it not expedient to require CONTRACTOR to correct Work not done in accordance with Contract Documents, an equitable deduction from the Contract Price will be made by agreement between CONTRACTOR and the GROUP, and subject to settlement, in case of dispute, as herein provided.

GC-33. INSURANCE

- A. "Personal Injury" means:
 - 1) false arrest, detention or imprisonment, or malicious prosecution; libel, slander, defamation or violation of right of privacy; wrongful entry or eviction or other invasion of right of private occupancy; and
 - 2) bodily injury, sickness or disease including death at any time resulting therefrom.

B. Workmen's Compensation:

- 1) CONTRACTOR shall carry or require that there be carried Workmen's Compensation Insurance and Employer's Liability Insurance for all its employees and those of its Subcontractors engaged in Work on the Site, in accordance with the laws of the State of New Jersey.

C. Commercial General Liability:

- 1) CONTRACTOR shall carry or require that there be carried Commercial General Liability Insurance with limits, as specified in Supplementary Condition SC-6, for:
 - a) Personal Injury: This shall protect CONTRACTOR, its SUBCONTRACTORS, and their heirs and assigns against all claims for injury to or death of one, or more than one person, because of accidents which may occur as a result from operations under this Contract; such insurance shall cover the use of all trenching machines, excavators, trucks, cranes, hoists, rollers, concrete mixers, motor vehicles, and other equipment as may be specified elsewhere, which may be used in the execution of this Contract. This Personal Injury Liability Insurance will be carried from commencement of Work to Final Inspection and Acceptance of the Work under this Contract, and will be extended to include insurance for completed operations. The completed operations portion of the Personal Injury Liability Insurance shall be extended for the entire period of the guaranty unless otherwise specified. This insurance shall cover owned, hired, and non-owned equipment.
 - b) Property Damage: This shall protect CONTRACTOR, its SUBCONTRACTORS, and their heirs and assigns from all claims for property damage, which might arise from operations under this Contract. Property Damage Liability shall be extended to include insurance for completed operations. The completed operations portion of the Property Damage Liability Insurance shall be extended for the entire period of the guaranty unless otherwise specified.
 - c) Manufacturers' and Contractors' Liability shall not exclude liability for personal injury or damages to property as a result of blasting, explosion, collapse of buildings or structures, and damage to underground installations.

D. Automotive Liability:

- 1) CONTRACTOR shall carry or require that there be carried Automotive Liability Insurance for personal injury and property damage with the limits, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR, its SUBCONTRACTORS, and their heirs, and assigns from all claims for any personal injury or property damage caused by an occurrence and arising out of the ownership, maintenance or use, including loading and unloading, of any vehicles during the operations under this Contract. This coverage shall include coverage for owned, hired, and non-owned vehicles.

E. Pollution Liability:

- 1) Contractor's Pollution Liability: CONTRACTOR shall carry or require that there be carried insurance, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR against losses caused by pollution conditions that arise from the operations of the CONTRACTOR or any SUBCONTRACTORS, suppliers, vendors, and agents, of all tiers, described under the scope of work of this Contract. Provide insurance coverage for:
 - a) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;
 - b) Property damage, including physical injury or destruction of tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed; and
 - c) Defense including costs, charges, and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages.

- 2) Pollution Legal Liability: CONTRACTOR shall carry or require that there be carried insurance, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR against losses that arise from the insured facility that is accepting any waste under this Contract. If the scope of services under this Contract requires the disposal of any hazardous or non-hazardous materials away from the Site, CONTRACTOR shall direct the disposal site operator to furnish a Certificate of Insurance for Pollution Legal Liability with coverage for:
 - a) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;
 - b) Property damage including physical injury, or destruction of, tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed; and
 - c) Defense including costs, charges, and expenses incurred in the investigation, adjustment, or defense of claims for such compensatory damages.

- 3) Coverage shall apply to sudden and non-sudden pollution conditions, including the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants, or pollutants into or upon land, the atmosphere or any water course or body of water, which results in bodily injury or property damage. The policy shall contain a provision that, in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery or subrogation against CONTRACTOR, the GROUP, the GROUP's REPRESENTATIVE, or the REMEDIAL DESIGNER.

F. Job Office Insurance:

- 1) CONTRACTOR, when required by Specifications, provide a job office for the use of the GROUP and the REMEDIAL DESIGNER, shall carry insurance for and in the name of the GROUP and the REMEDIAL DESIGNER, or accept full responsibility (in writing) for loss of damage to the contents to cover office

records, supplies, instruments, equipment, and personal property of the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER using said field offices.

G. CONTRACTOR shall carry or require that there be carried any other insurance as required by Supplementary Condition SC-6.

H. Endorsements:

- 1) Commercial General Liability Insurance shall include an endorsement stating: "This policy shall cover owned, hired, and non-owned equipment." Coverage for completed operations for both personal injury and property damage extended for the period of guaranty shall be covered under this policy. Commercial General Liability coverage includes liability for personal injury or damages as a result of blasting, explosion, collapse of buildings or structures, and damage to underground installations.
- 2) Automotive Liability Insurance shall include an endorsement as follows: "This policy shall cover owned, hired, and non-owned vehicles."
- 3) All Policies shall include:
 - a) An endorsement of the Work description, Contract name, and location;
 - b) An endorsement that the Insurance Company will give at least thirty (30) days written notice to the GROUP, prior to any modification or cancellation of any such policy;
 - c) An endorsement that CONTRACTOR will be responsible for payment of all premiums and/or charges; and
 - d) An endorsement as follows: "This policy is issued in compliance with the Insurance Requirements of the Contract Documents for OU-2 Final Remedy, and the issuing Company/Agent is fully cognizant of the requirements, as stated therein."
- 4) All insurance required herein (except for Worker's Compensation and Employer's Liability) shall name the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and their officers, directors, agents, and employees as "additional insureds" under all policies.
- 5) All insurance shall be placed with carriers with a current A.M. Best's rating of no less than A, VII, unless otherwise approved by the GROUP. The required additional insured endorsements shall apply solely to work performed under this Contract. The providing of insurance, including the aforementioned additional insured endorsements, shall not be construed as CONTRACTOR's or its insurers' assumption of any liability arising out of any negligent act, omission or breach of obligation by the GROUP and/or the REMEDIAL DESIGNER.
- 6) With respect to the additional insured endorsement required under CONTRACTOR's Pollution Liability policy, the following additional terms apply:

- a) The required additional insured endorsements shall provide coverage only with respect to claims to the extent caused by CONTRACTOR in the performance of work under this Contract;
- b) Such endorsements shall be subject to all exclusions, exceptions, limitations, restrictions, and requirements set forth in such policies and available to Contractor under this Contract, at law, or in equity; and
- c) The additional insured endorsements apply only to CONTRACTOR's Commercial General Liability, Automotive Liability, and Pollution Liability portion of CONTRACTOR's policies. No coverage is provided to the additional insureds in any way with respect to the Professional Liability portion of CONTRACTOR's policies.

I. Proof of Insurance:

- 1) Before commencing any work under this Contract, CONTRACTOR shall submit copies of its Certificates of Insurance to the GROUP REPRESENTATIVE evidencing that all insurance policies and limits, as required herein, are in force. The policies shall be identified by title, policy number, effective date, expiration date, coverages, and limits of liability. Required or verbatim quotes of endorsements as required above or by the Special Conditions and any non-standard exclusion endorsements for any required policies shall be attached to or be a part of the CONTRACTOR's Certificates of Insurance.
- 2) CONTRACTOR must either include coverage for his SUBCONTRACTORS in its policies or submit similar Certificates of Insurance for each SUBCONTRACTOR before their work commences. Each SUBCONTRACTOR must be covered by insurance of the same character and in no less than the same amounts as CONTRACTOR unless CONTRACTOR and the GROUP agree that a reduced coverage is adequate because of the nature of the particular Subcontracted Work.
- 3) During the course of construction under this Contract, whenever there is a lapse in the insurance requirements as stated herein, through cancellation, expiration, failure to renew, or any other cause, the GROUP shall order the cessation of all construction activities until such time as the insurance requirements are complied with. CONTRACTOR shall have no claim or claims whatever against the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or other parties due to any delays caused thereby, nor shall such delays extend the completion time of the Contract.

J. Approval/Disapproval of Insurance:

- 1) Upon receipt of the Certificate(s) of Insurance, the GROUP will, in writing, identify the policies and indicate its approval or disapproval. New policies from other companies shall be provided in place of those disapproved. Such insurance shall only be carried with financially responsible insurance companies, licensed in the State and approved by the GROUP.
- 2) All policies shall be kept in force until CONTRACTOR's work is accepted by the GROUP (unless otherwise specified). Insurance policies (covering all operations

under this Contract or, if so noted for extended operations) which expire before CONTRACTOR's work is accepted by the GROUP (or where noted for extended operations, through the period of guaranty) shall be renewed and evidence of same submitted to the GROUP for its approval.

GC-34. PATENTS

- A. CONTRACTOR shall hold and save the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and their officers, employees, and agents harmless from liability of any nature or kind, including, but not limited to, court costs and attorney's fees, for or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the GROUP, unless otherwise specifically stipulated in the Specifications.
- B. CONTRACTOR shall pay all license fees and royalties related to or necessary for the Work and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of the GROUP, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be specified in the Contract Documents.

GC-35. WARRANTY OF TITLE

- A. No material, supplies, or equipment incorporated or to be incorporated in the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier.
- B. CONTRACTOR shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the GROUP free from any claims, liens or charges.
- C. Neither CONTRACTOR, nor any person, firm, or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon.
- D. Nothing, however, contained in this General Condition shall defeat or impair the right of person furnishing materials or labor to recover under any law permitting such persons to look to funds due to CONTRACTOR in the hands of the GROUP.
- E. The provisions of this General Condition shall be inserted in all Subcontracts and material Contracts, and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

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GC-36. GENERAL GUARANTY

- A. Neither the "*Request for Final Payment*", nor any provision in the Contract, nor partial or entire use of the improvements embraced in this Contract by the GROUP or the public shall constitute an acceptance of Work not done in accordance with the Contract or relieve CONTRACTOR of liability in respect to any express warranties or responsibility for faulty materials or workmanship.
- B. CONTRACTOR shall promptly remedy any defects in the Work without any additional compensation and pay for any damage to other Work resulting therefrom, which shall appear within a period of twelve (12) months from the date of Final Acceptance of the Work by the GROUP.
- C. The GROUP will give notice of defective materials and work with reasonable promptness.

GC-37. REQUIRED PROVISIONS DEEMED INSERTED

- A. Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

GC-38. CORRECTIONS

- A. The REMEDIAL DESIGNER will have the right to correct any discrepancies, inconsistencies, and errors in the Contract Documents, when such corrections are necessary for the proper expression of their intent.
- B. Such corrections shall take effect from the time the REMEDIAL DESIGNER gives notice thereof, and any alterations in the Work rendered necessary thereby shall be made as corrected.
- C. Any discrepancies between the approved Contract Drawings and Specifications, or any disagreement in measurements upon the Contract Drawings must be submitted to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER before construction of the Work. See General Condition GC-2 additional requirements.

GC-39. SAFETY PROVISIONS

- A. The safety provisions of applicable laws, building, and construction codes and the safety codes approved by the State Labor Commissioner shall be observed.
- B. The provisions of the Federal Occupational Safety and Health Administration's "Occupational Safety and Health Standards" and "Safety and Health Regulations for Construction" shall be observed.

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- C. Should at any time during the work under this Contract any local state, and federal safety inspector visit the Site for the purpose of a safety inspection, CONTRACTOR shall immediately notify the GROUP's REPRESENTATIVE on-Site.
- D. CONTRACTOR shall employ watchmen, as necessary, shall erect and maintain such strong and suitable barriers, and shall install lights, as necessary, to effectually prevent the happening of any health and safety incidents and/or accident. Lights shall be maintained between the hours of sunset and sunrise, and during periods of low visibility.
- E. If at any time in the opinion of the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER, the Work is not properly lighted, barricaded, and in all respects safe, both in respect to public travel or adjacent property, public or private, and if under such circumstances CONTRACTOR does not or cannot immediately put the same into proper and approved condition, or if CONTRACTOR or his representative is not upon the ground so that he can be immediately notified of the insufficiency of safety precautions, then the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER may put the Work into such a condition that shall be, in their opinion, in all respects safe, and CONTRACTOR shall pay all expenses of such labor and materials as may have been used for this purpose or by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER. Such action of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, or its failure to take such action, shall in no way relieve CONTRACTOR of the entire responsibility for any cost, loss, or damage by any party sustained on account of the insufficiency of the safety precautions taken by CONTRACTOR or by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER acting under authority of his section.

GC-40. NIGHT WORK, SUNDAYS AND HOLIDAYS

- A. CONTRACTOR shall not undertake or allow any Work to be performed on-Site without the full-time presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER.
- B. Only with the prior approval of the GROUP shall night work, work on Sundays, or Work on legal holidays, be permitted except for emergencies or as specified elsewhere.
- C. Should night work be permitted or required, the lighting and other facilities which are necessary for performing such work must be provided by CONTRACTOR and comply with the applicable safety codes.
- D. CONTRACTOR may request, in writing, permission from the GROUP's REPRESENTATIVE to undertake or allow Work to be performed on-Site without the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER full-time presence. The written request will specify the precise Work to be performed, the dates and time the Work will be performed, and the justification of the necessity to undertake or allow the Work to be performed without the presence of the GROUP's REPRESENTATIVE and/or REMEDIAL DESIGNER. The GROUP's REPRESENTATIVE may grant or deny permission at its discretion.

GC-41. OBSTRUCTIONS ENCOUNTERED

- A. In addition to showing the construction under this Contract, the drawings may show certain information obtained by the GROUP regarding conditions and features, which exist at the Site of the Work, both at and below the surface of the ground. The GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER expressly disclaim any responsibility for the accuracy or completeness of the information given on the Contract Drawings with regard to existing conditions and features, and CONTRACTOR will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information except as provided under the Sections General Conditions GC-11 and GC-41.
- B. It is specifically called to CONTRACTOR's attention that all services, laterals, etc., are not shown on the Contract Drawings, and it shall be CONTRACTOR's responsibility to locate and protect the same, as necessary.
- C. Information regarding conditions and features, which exist at the Site of the Work, both at and below the surface of the Ground, are shown in the Contract Documents only for the convenience of CONTRACTOR, who must verify this information to its own satisfaction. The giving of this information upon the Contract Drawings will not relieve CONTRACTOR of its obligations to support and protect all existing utilities, structures, and fixtures, which may be encountered during the construction of the work, except as provided in the General Conditions GC-11 and GC-41, and to make good all damages done to such existing utilities, structures, and fixtures, as provided within the Specifications.

GC-42. EXISTING UTILITIES, STRUCTURES AND FIXTURES

- A. CONTRACTOR shall, at its own expense, do everything necessary to locate, support, protect, and sustain all sewer, water, gas, or service pipes, electric light, power poles, telephone, or telegraph poles, manholes, valve boxes, conduits, and any and all utilities, structures or fixtures laid across or along the Site of the Work.
- B. The GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, as well as the company or corporation owning said utilities, structures, or fixtures, shall be notified in writing prior to approaching, uncovering, or supporting any utility, or before any utilities, structures or fixtures are removed or relocated. In case any of the said utilities, structures or fixtures are damaged by CONTRACTOR, they shall be repaired by CONTRACTOR at its own expense, or by the authorities having control of the same, and the expense of said repairs shall be deducted from the monies due or to become due to CONTRACTOR under this Contract.
- C. Should it become necessary for CONTRACTOR to remove or relocate any utilities, structures, or other fixtures, due to a grade and alignment conflicts, which would require the proposed utility, structure, or fixture (not trench excavation, sheeting, or other construction features) to occupy the same space the existing pipe, pole, conduit, and/or other fixture, such removal or relocation will be paid for in accordance with the provisions for General Condition GC-10. Should said utilities, structures or other

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fixtures be removed or relocated by the GROUP or the respective utility companies at no cost to CONTRACTOR, no payment will be made therefore.

- D. Prior to any removal or relocation of existing facilities, structures, or fixtures, CONTRACTOR shall notify the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER of the location and circumstances of such, and shall cease work (which might prove detrimental to the utility, structure, or fixture encountered), if necessary until satisfactory arrangements have been made with the owners of the same to properly care for them.
- E. Should it be necessary to cease work and a delay is caused thereby, CONTRACTOR shall have no claim for damages or any claim other than for an extension of time. See General Conditions GC-12 and GC-13.
- F. If CONTRACTOR desires temporary changes of location for its convenience for any reason whatsoever, of water lines, gas lines, sewer lines, wire lines, service connections, water, and gas meter boxes, valve boxes, light standards, cableways, signals, and any other utilities, structures or fixtures, it shall satisfy the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER that the proposed relocation does not interfere with its or other Contractor's operations, or the requirements of the Contract Drawings, and does not cause an obstruction or a hazard to traffic. CONTRACTOR shall make his own request to the utility companies, pipe owners or other parties affected for such relocation work. Such relocation work for the convenience of CONTRACTOR shall be made solely at CONTRACTOR's expense.
- G. CONTRACTOR shall not remove or relocate any utility, structure or fixture without the written approval of the owner of that utility, structure or fixture unless otherwise shown on the Contract Drawings, specifications or ordered by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER.

GC-43. CONTROL OF EXISTING FLOWS

- A. During the construction of all proposed work, CONTRACTOR shall take every precaution and do the necessary work to maintain the flow of storm drainage, sanitary sewage, and natural flows through the working areas. CONTRACTOR is solely responsible for providing all appropriate flow control systems, and there shall be no separate payment for this required work.
- B. CONTRACTOR shall be responsible for any flooding or sanitary backups on its work and to the property owners affected by such flooding or backup. CONTRACTOR shall make such provisions as may be required by the local, state, or federal health officers or any other public bodies with jurisdiction over the flows of storm drainage, sanitary seepage, and natural flows.
- C. In the event CONTRACTOR uses water from natural water sources for its operations, intake methods shall be such as to create no harmful effects; and where water is taken from a stream, reasonable flows downstream from the intake shall be maintained.

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- D. CONTRACTOR shall sequence its Work such that the infiltration of rainwater across the Site is minimized to the greatest extent reasonably practical. In particular, CONTRACTOR shall take all reasonable and appropriate provisions to limit the extents of the existing geomembrane removal, and shall be required to collect/remove all infiltrated rainwater, as necessary, to maintain internal flow gradients across the perimeter soil bentonite cut-off wall.

GC-44. SEWAGE, SURFACE, GROUNDWATER AND FLOOD FLOWS

- A. CONTRACTOR shall furnish all the necessary equipment, shall take all necessary precautions, and shall assume the entire cost of handling any sewage, seepage, storm, ground water, surface, and flood flows that may be encountered at any time during the construction of the Work. The manner of providing for these flows shall meet the approval of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, and the entire cost of said work shall be incorporated into the unit or lump sum bid prices for the various items of the Work to be done under this Contract.
- B. CONTRACTOR shall employ such feasible and practical methods in its operations to prevent pollution, sedimentation, or the introduction of impurities or other objectionable materials that may become suspended or dissolved in waters reaching streams, ponds, lakes, water supplies, or other water bodies.
- C. Water shall not be disposed of by discharging it into any street gutter, drainage channel, existing drainage system, natural stream, waterway, lake, pond, or bog, etc. without prior approval of the Authority having jurisdiction thereof and the GROUP's REPRESENTATIVE. Should such approval be obtained, CONTRACTOR shall ensure that no solids, debris, suspended soil particles, impurities, or pollutants are allowed to enter the drainage system. CONTRACTOR shall be fully responsible for any damages to these systems resulting from its disposal methods and any necessary measures (such as, but not limited to, cleanup) required to return the system to pre-construction conditions. In addition to the above, disposal on private property shall only be allowed with prior written permission of the impacted property owners.
- D. Any water used for any purpose by CONTRACTOR shall not be discharged in such a manner as to create pollution, sedimentation, or other adverse effects upon the aforementioned streams of waters.

GC-45. CONNECTING TO EXISTING WORK

- A. If appropriate to the Work, CONTRACTOR shall remove such existing masonry, concrete, equipment, and piping, as necessary and required by the Contract Documents, to make proper connections to the existing work at the locations shown.
- B. Also, CONTRACTOR shall make the necessary pipeline, roadway, and other connections at the severed points, so on completion of this Contract water, sewage, or stormwater, as the case may be, will flow through severed pipelines and structures.

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- C. Unless otherwise specified herein, no extra payment will be made for this Work, but the entire cost of the same shall be included in the unit or lump sum bid prices for the various items of the Work to be done under this Contract.

GC-46. EXISTING IMPROVEMENTS

- A. CONTRACTOR shall conduct its work as to minimize damage to existing improvements, except where specifically stated otherwise in the Contract Drawings and/or Specifications, and it will be the responsibility of CONTRACTOR to restore, as nearly as practical, to their original conditions all improvements on public or private property damaged by the Work performed by CONTRACTOR.
- B. Utility mains, ducts, poles, and services in the construction area, where shown on the Contract Drawings, are at the approximate locations furnished by various utilities concerned. These locations are subject to possible errors in the source of the information, and also, errors in transcription. CONTRACTOR shall make certain of the exact location of mains, ducts, poles, and services prior to excavation or construction near the same.
- C. The various utility companies shall be made aware of the pending construction and made generally familiar with the locations of conflicts in the case of the proposed construction. The various utility companies shall be requested to make all adjustments to their own lines except where otherwise shown on the Contract Drawings or specified. CONTRACTOR shall give ample notice to the various utilities so that existing lines can be marked in the field and adjustments made. CONTRACTOR shall cooperate fully with the various utilities and shall plan its work so that least interference is caused for all parties concerned. No additional payments shall be made to CONTRACTOR for delays caused by utility interference due to negligence on the part of CONTRACTOR. CONTRACTOR shall support all utility lines uncovered during excavation.

GC-47. SITE ACCESS

- A. CONTRACTOR shall make every effort to minimize damage to all access routes, and it shall be required to restore them to their original condition. CONTRACTOR shall acquire all necessary permits for working, on or from public streets or rights-of-way, and for securing additional access rights thereto.
- B. All costs for the removal and restoration, to original conditions, of walls, fences, structures, utility lines, poles, guy wires, or anchors, and other improvements required for passage of CONTRACTOR's equipment shall be borne by CONTRACTOR. CONTRACTOR shall notify the proper authorities of the local governing bodies and all utilities of any intended modification or disruption to their property, prior to start of construction, and shall cooperate with them in the scheduling and performance of his operation.
- C. If CONTRACTOR, by direct negotiation and bargain with any land owner, leasee, or tenant has secured any right(s) to use more space or greater privileges than the space

provided by the GROUP for purposes incidental to the performance of this Contract, CONTRACTOR shall, upon request of the GROUP's REPRESENTATIVE an/or the REMEDIAL DESIGNER, furnish proper written evidence that such additional rights have been properly secured and assurance that no damage to or claim upon the GROUP and/or local governing body will arise therefrom. The GROUP and/or local governing body shall not be liable in any way for any expenses incurred by CONTRACTOR in order to secure any such right(s) to use additional property.

- D. CONTRACTOR shall be responsible for and reimburse the GROUP for any and all losses, damages, or expenses that the GROUP may suffer, either directly or indirectly or through any claims of any person or party, for any trespass outside the spaces and rights-of-way provided by the GROUP to CONTRACTOR or any violation or disregard of the terms and conditions established for the use or occupancy of those rights or for negligence in the exercise of those rights.
- E. The GROUP may retain or deduct from any sum or sums due or to become due to CONTRACTOR such amount or amounts as may be proper to insure the GROUP and/or local governing bodies against loss or expense by reason of the failure of CONTRACTOR to observe the limits and conditions of the rights-of-way, rights-of-access, etc. provided by the GROUP.

GC-48. ACCESS TO ADJACENT PROPERTIES

- A. CONTRACTOR shall at all times maintain vehicular and pedestrian access to all properties abutting or adjacent to the Site under this Contract, all at CONTRACTOR's sole expense. In the event that normal access is cut off to a particular property due to operations or proposed work called for under this Contract, CONTRACTOR shall, at its sole expense, make other arrangements for access to said property satisfactory to the impacted property owner/tenant and the GROUP.

GC-49. USE OF ROADWAYS

- A. During the progress of the Work, CONTRACTOR shall make ample provision for both vehicular and foot traffic on any public road, and shall indemnify and save harmless the GROUP from any expense whatsoever due to its operations and/over said roadways.
- B. CONTRACTOR shall also provide free access to all fire hydrants, water and gas valves located along the line or in the vicinity of its Work. Gutters and waterways must be kept open or other provisions made for the removal of stormwater.
- C. In the event of CONTRACTOR's failure to comply with these provisions, the GROUP may cause the same to be done, and will deduct the cost of such work from any monies due or to become due CONTRACTOR under this Contract, but the performance of such work by the GROUP or at its insistence shall serve in no way to release CONTRACTOR from its general or particular liability for the safety of the public or the work.

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GC-50. SNOW REMOVAL

- A. If CONTRACTOR's operations or occupancy of any public street or highway, or the rough surfaces over any trench or area being maintained by CONTRACTOR, shall interfere with the removal or plowing of snow or ice by the public authorities or land owners, or sanding of icy surfaces, in the ordinary manner with regular highway equipment, then CONTRACTOR shall perform such services for the said public authorities or owners without charge, or failing to do so, shall reimburse said authorities, owners, or the City for any additional costs to them for doing such work occasioned by the conditions arising from CONTRACTOR's operations, occupancy, or trench surfaces, together with any damage to the equipment of said parties by those conditions, or claims of any party for damage or injury or loss by reason of failure to remove snow or ice or to sand the icy spots under those conditions.

GC-51. WEATHER CONDITIONS/WORK IN FREEZING WEATHER

- A. In the event of temporary suspension of work, or during inclement weather, or whenever the GROUP's REPRESENTATIVE shall direct, CONTRACTOR and its SUBCONTRACTORS shall protect all Work areas and stored materials against damage or injury from the weather.
- B. If, in the opinion of the GROUP's REPRESENTATIVE, any Work or materials shall have been damaged or injured by reason of failure on the part of CONTRACTOR or any of its Subcontractors to protect its Work, such materials shall be removed and replaced at the expense of CONTRACTOR.
- C. Unless written permission is granted by the GROUP, Work liable to be affected by frost or freezing shall be suspended during freezing weather. When work proceeds under such a condition, CONTRACTOR shall provide approved facilities for heating the materials and for protecting the finished Work. If any materials or finished Work is allowed to become damage during freezing weather due to CONTRACTOR's fault, such materials and/or finished Work shall be repaired or replaced at the CONTRACTOR's own expense.

GC-52. INTOXICATING LIQUORS/CHEMICAL SUBSTANCES

- A. CONTRACTOR shall neither permit nor suffer the introduction or use of intoxicating liquors or mind altering chemical substances upon or about the Work specified in this Contract or upon any of the grounds occupied by CONTRACTOR and its employees.
- B. If the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER believe, in its/their opinion, any person(s) working on-Site, on behalf of CONTRACTOR or any of its SUBCONTRACTORS, is intoxicated or under the influence of mind altering chemical substances, CONTRACTOR shall be directed to forthwith remove such person(s) from the Site, and said person(s) shall not be allowed to again work on any part of the remaining Work without written consent of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.

GC-53. INDEMNIFICATION

- A. CONTRACTOR shall indemnify and hold harmless the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, other Contractors, and their consultants, agents, representatives, and employees from and against all claims, demands, suits, damages, including consequential damages and damages resulting from personal injury (as defined in General Condition GC-33-A) or damage to property, costs, expenses and fees arising out of or resulting from the performance of the Work, provided that such claims, demands, suits, damages, costs, expenses and fees are caused in whole or in part by any acts or omissions of CONTRACTOR or any of its SUBCONTRACTORS, person(s), or organization(s) for whose acts CONTRACTOR is liable.
- B. In any and all claims against the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or any of their consultants, agents, representatives, or employees by any employees of CONTRACTOR, any of its SUBCONTRACTORS, or any person(s) or organization(s) employed by any of them to perform or furnish any of the Work or anyone for whose acts any or them may be liable, this indemnification obligation, as presented in General Condition GC-53-A herein, shall not be limited in any way by limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR, any of its SUBCONTRACTORS, other person(s) or organization(s) under Workers' or Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.
- C. To the extent permitted by law, this indemnification obligation, as presented in General Condition GC-53-A herein, shall apply regardless of whether or not such claims, demands, suits, damages costs, expenses, and fees are caused in whole or in part by any person indemnified hereunder.

GC-54. DISPUTES

- A. All disputes between the parties arising out of, or in any way related to this Contract and/or the performance of the same, or its interpretation, except those disputes covered by Federal Labor Standards Provisions, shall within ten (10) days of the event or action giving rise to the dispute be presented to the GROUP's REPRESENTATIVE. All papers pertaining to the dispute shall be filed in triplicate. Such notice shall state the factors surrounding the dispute in sufficient detail to identify the dispute, together with its character and scope. In the meantime, CONTRACTOR shall proceed with the work under this Contract as directed.
- B. Any dispute not presented within the time limit specified above shall be deemed to have been waived, except that if the dispute is of a continuing character and notice of the dispute is not given within ten (10) days of its commencement, the dispute will be considered only for a period commencing ten (10) days prior to the receipt by the GROUP's REPRESENTATIVE of notice thereof. CONTRACTOR shall in no case allow any dispute to delay the work under this Contract.
- C. As soon as practicable after the final submission of all information the GROUP shall make a determination of the dispute. Said decision of the GROUP shall be a condition

precedent to any further action on the dispute. However, upon certification in writing by the claimant that the dispute has been submitted in this final form, the GROUP shall be obliged to render a decision on said dispute within sixty (60) days of the date of said certification. Should the GROUP fail to render its decision within the aforementioned sixty (60) day period, its decision will not be a condition precedent to any further action on the part of the claimant.

- D. Each decision by the GROUP will be in writing, and will be delivered to CONTRACTOR, by Federal Express/UPS or registered/certified mail, return receipt requested, at its last known address.
- E. In the event of an unfavorable decision by the GROUP, CONTRACTOR shall have the right to contest said decision as provided for under the provision of this Contract. CONTRACTOR shall notify the GROUP promptly that it intends to contest said decision, but agrees to proceed with the Work under protest.

GC-55. ARBITRATION AND LITIGATION

- A. Any controversy or claim arising out of or relating to this Contract, or the breach thereof, shall at the option of the GROUP be settled by arbitration in accordance with the Rules of the American Arbitration Association, and judgment upon the award rendered by the Arbitrator(s) may be entered in any Court having jurisdiction thereof.
- B. The GROUP will exercise its option to arbitrate concurrent with the rendering of its final decision on any claims submitted by CONTRACTOR. Should it fail to enter a final decision within the prescribed time or fail to exercise its option, said claims will be determined in accordance with the Rules of the American Arbitration Association as hereinafter stated.

GC-56. GOVERNING LAW

- A. Unless otherwise provided in the Contract Documents, this Contract and the Contract Documents shall be governed by the law of the State of New Jersey.

***** END OF SECTION *****

CONTRACT DOCUMENT ADDENDUM NO. 5

Golder Associates Inc.

The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Telephone (973) 645-1922
Fax (973) 645-1588
www.golder.com



943-6222

ADDENDUM NO. 5

To: Gregory S. Tunstall, P.E.

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, D. Walsh, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 5**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Friday, January 18, 2008

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 5 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

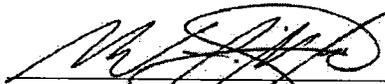
- a) Replace the "Table of Contents" (revision 0) of the Specifications in its entirety with the attached revised Table of Contents (revision 1);
- b) Replace Section 00300 "Bid Forms" (revision 0) of the Specifications in its entirety with the attached revised Section 00300 "Bid Forms" (revision 1);
- c) Replace Section 00600 "Construction Agreement" (revision 0) of the Specifications in its entirety with the attached revised Section 00600 "Construction Agreement" (revision 1);
- d) Replace Section 00610 "Performance Bond" (revision 0) of the Specifications in its entirety with the attached revised Section 00610 "Performance Bond" (revision 1);
- e) Replace Section 00620 "Payment Bond" (revision 0) of the Specifications in its entirety with the attached revised Section 00620 "Payment Bond" (revision 1);
- f) Replace Section 00700 "General Conditions" (revision 1) of the Specifications in its entirety with the attached revised Section 00700 "General Conditions" (revision 2);

- g) Replace Section 00800 “Supplementary Conditions” (revision 0) of the Specifications in its entirety with the attached revised Section 00800 “Supplementary Conditions” (revision 1);
- h) Replace Section 01015 “Definitions” (revision 0) of the Specifications in its entirety with the attached revised Section 01015 “Definitions” (revision 1);
- i) Replace Section 01025 “Measurement and Payment” (revision 1), in its entirety with the attached revised Section 01025 “Measurement and Payment” (revision 2);
- j) New, additional Section 01026 “Schedule of Values” (revision 0);
- k) New, additional Section 01027 “Applications for Payment” (revision 0); and
- l) Replace Section 02460 “Steel Sheet Piling” (revision 1) of the Specifications in its entirety with the attached revised Section 02460 “Steel Sheet Piling” (revision 2).

Please review all of the above new, modified Specification Sections in their entirety. In addition, please complete and reissue the modified Bid Forms (Section 00300), so that we can proceed with issuing a “Notice of Intent to Award” for the subject Contract.

If anyone has any questions or requires additional information, please feel free to contact the undersigned at (973) 645-1922 (ext. 31303).

PREPARED BY:



Mark F. McNeilly, P.E.
Practice Leader and Associate

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BID FORMS

SUBMIT BID PROPOSALS TO:

216 Paterson Plank Road Cooperating PRP Group
c/o Golder Associates Inc.
The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102

Attn: Mr. P. Stephen Finn, C.Eng.
Project Coordinator

**Re: 216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY**

Ladies and Gentlemen:

- 1) The undersigned BIDDER proposes and agrees to enter into an Agreement with the 216 Paterson Plank Road Cooperating PRP Group (“the GROUP”), in the form included in Section 00600 of the Specifications, to perform, furnish, and complete all Work specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid Proposal.
- 2) BIDDER accepts all of the terms, conditions, covenants, and provisions presented in the Contract Documents.
- 3) BIDDER agrees to deliver three (3) copies of this Bid Proposal, including all documents required by the Bidding Requirements and bearing original signatures of the duly designated individual with authority to execute this Agreement.
- 4) In submitting this Bid Proposal, BIDDER represents, as set forth in the Agreement, that:
 - a) BIDDER has carefully examined and studied all identified Contract Documents, and hereby acknowledges receipt of the following Addenda to the Contract Documents:
 - Addendum No. 1, dated September 24, 2007;
 - Addendum No. 2, dated September 26, 2007;
 - Addendum No. 3, dated October 4, 2007;
 - Addendum No. 4, dated October 8, 2007; and
 - Addendum No. 5, dated January 18, 2008.

- b) BIDDER has visited the Site and become familiar with and is satisfied as to the existing Site conditions and constraints, which may affect BIDDER's sequences and methods of construction, costs, progress, duration, and performance of the Work, as specified in the Contract Documents;
- c) BIDDER is familiar with and is satisfied as to all federal, state, and local laws, rules, and regulations, which may affect BIDDER's sequences and methods of construction, costs, progress, duration, and performance of the Work, as specified in the Contract Documents;
- d) BIDDER has obtained and review copies of the Record of Decision (ROD) and Consent Decree (CD) for the subject Site and project;
- e) BIDDER has carefully studied all available investigative, feasibility study, and design reports, drawings, figures, information, and data, as listed in Section 00200 of the Specifications, it deemed necessary and relevant to its preparation of the Bid Proposal. BIDDER acknowledges that such reports, drawings, figures, information, and data are not part of the Contract Documents, and may not be complete for BIDDER's purposes;
- f) BIDDER acknowledges that the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER do not assume responsibility for the accuracy and/or completeness of information and data presented, shown, or indicated in the Bidding Documents with respect to subsurface conditions and/or Underground Facilities (e.g., buried utilities) at or contiguous to the Site;
- g) BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site, which may affect BIDDER's planned sequences and methods of construction, costs, progress, duration, safety precautions, and performance of the Work, as specified in the Contract Documents;
- h) BIDDER does not believe and agrees that no additional examinations, investigations, explorations, tests, studies, or data concerning conditions, at or contiguous to the Site, are necessary for its preparation of this Bid Proposal to perform, furnish, and complete all Work specified or indicated in the Contract Documents;
- i) BIDDER recognizes and understands what the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER's authority is in connection to the subject remedial construction project, as stipulated in this Agreement, and agrees to work cooperatively and collaboratively with the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER to successfully complete the Work within the specified Contract Time;
- j) BIDDER agrees to implement its best efforts to complete the Work, as defined by the Contract Documents, within two-hundred-sixty (260) consecutive calendar days following the commencement date stipulated in the GROUP's "Notice to Proceed" to BIDDER, and understands it will not be subject to liquidated damages or declared in default, if BIDDER is unable to complete such work within this period, provided such inability is not due to

- BIDDER's default or inability to complete the Work, as specified in the Contract Documents;
- k) BIDDER has given the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER written notice of all conflicts, errors, ambiguities, inconsistencies, or discrepancies that BIDDER discovered, during the Bid Proposal preparation period, in the Contract Documents. BIDDER also acknowledges that written resolution thereof by either the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER has been received by BIDDER, is acceptable to BIDDER, and the Contract Documents are sufficient to indicate and convey understanding of all terms, conditions, covenants, provision, and requirements of the Contract documents;
 - l) This Bid Proposal is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation, and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;
 - m) BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or deceptive Bid Proposal, under false or fraudulent pretences;
 - n) BIDDER has not solicited or induced any person, firm, or corporation to refrain from bidding; and
 - o) BIDDER has not sought, by collusion, to obtain for itself any advantage over any other BIDDER or over the GROUP.
- 5) Per the Instruction to Bidders, BIDDER has completed both the "*Base Bid*" and "*Alternate Bid - A*" cost summary tables (see Exhibits "A" and "B", respectively, attached to these Bid Forms) to complete the Work, as specified in the Contract Documents. BIDDER acknowledges that any decision by the GROUP to implement any additional items identified in "*Alternate Bid - A*" will not be made until after completion of the specified In-situ "Hot Spot" Treatment field verification program. If the GROUP is not required to implement "*Alternate Bid - A*", BIDDER will not be entitled to any compensation under "*Alternate Bid - A*", and will be required to complete the Work specified in the Contract Documents in accordance with the prices/costs presented in BIDDER's "*Base Bid*".
- 6) The following documents are attached to and made conditions to (i.e., fully part of) this Bid Proposal:
- a) BIDDER shall provide a detailed listing of all SUBCONTRACTORS, suppliers, vendors, and other individuals and entities that BIDDER envisions or intends to enter into separate Subcontract agreements to perform any portions the Work or to provide materials, products, or equipment, as specified by the Contract Documents (see Exhibit "C" to these Bid Forms). BIDDER shall also provide the anticipated, estimated value for all portions of the Work intended to be performed by SUBCONTRACTORS;
 - b) BIDDER shall provide a Baseline Construction Progress Schedule (see Exhibit "D" to these Bid Forms), which indicates that the Work will be completed within the specified Contract Time, and this schedule shall detail BIDDER's propose, planned sequences of construction;

- c) BIDDER shall provide a tabulation of “*time and material*” direct rates for any construction equipment and/or personnel used to prepare this Bid Proposal (see Exhibit “E” attached to these Bid Forms), which would be used to evaluate this Bid Proposal and form the basis for any additional work not covered by the prices/costs presented in BIDDER’s “*Base Bid*” and “*Alternate Bid - A*” cost summary tables, as attached to these Bid Forms. This additional Work may be performed at unit rates negotiated with and approved by the GROUP or on a “time and materials” basis using the unit price list BIDDER included with this Bid Proposal. Bidder will include all costs for the associated operators and maintenance in its proposed unit rates for any and all construction equipment; and
- d) BIDDER shall provide a detailed listing of all Bid Proposal assumptions (See Exhibit “F” to these Bid Forms).
- 7) BIDDER will complete the Work, as specified in the Contract Documents, for the prices/costs presented and attached to these Bid Forms, unless modified in accordance with the terms, conditions, covenants, and provisions incorporated into the Agreement and approved by the GROUP.
- 8) BIDDER accepts the provisions of this Agreement related to “liquidated damages”, in event of failure, by BIDDER, to complete the Work within the specified Contract Time.
- 9) All communication concerning this Bid Proposal shall be forwarded to:
- Golder Associates, Inc.
Attn: Mr. Mark F. McNeilly, P.E.
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Phone: (973) 621-0777
Fax: (973) 621-7725
Email: mmcneilly@golder.com
- 10) BIDDER acknowledges that the terms, conditions, covenants, provisions, and requirement incorporated into this Bid Proposal, which are defined in the Contract Documents, have the same meanings indicated in the Contract Documents.

January 2008
943-6222

216 Paterson Plank Road Site
OU-2 – Technical Specifications
Bid Forms – 00300
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Revision 1

Declarations:

IN WITNESS WHEREOF, BIDDER hereby signs, seals, and delivers three (3) hard copies and one (1) electronic (i.e., PDF file format) of this Bid Proposal for consideration by the GROUP.

SIGNED, sealed, and delivered this _____ day of _____, 2008.

By: _____

Name: _____

Title: _____

Date: _____

(Provide evidence of authority to sign this Bid Proposal. See attached)

CONTRACTOR's New Jersey License No. _____.

SUBSCRIBED AND SWORN TO BEFORE ME, the undersigned notary, by
_____ this _____ day of _____, 2008.

Notary Public for State of _____

Printed Name of Notary: _____

My Commission Expires: _____

January 2008
943-6222

216 Paterson Plank Road Site
OU-2 – Technical Specifications
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Revision 1

If BIDDER is:

An Individual:

Name (typed/printed): _____
(SEAL)

By: _____
(Signature of Individual)

Doing business as: _____

Business Address: _____

Phone Number: _____

Facsimile Number: _____

Email Address: _____

January 2008
943-6222

216 Paterson Plank Road Site
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If BIDDER is:

A Partnership:

Partnership Name: _____
(SEAL)

Name (typed/printed): _____

By: _____
(Signature of general partner)
(Attach evidence of authority to sign)

Business Address: _____

Phone Number: _____

Facsimile Number: _____

Email Address: _____

Revision 1

If BIDDER is:

A Corporation:

Corporation Name: _____
(CORPORATE SEAL)

State of Incorporation: _____

Type of Corporation: _____
(General Business, Professional, Services, Limited Liability)

By: _____
(Signature of authorized agent of corporation)
(Attach evidence of authority to sign)

Name (typed/printed): _____

Title: _____

Attest: _____
(Signature of Corporate Secretary)

Date of Qualification
To do business is: _____

Business Address: _____

Phone Number: _____

Facsimile Number: _____

Email Address: _____

Revision 1

If BIDDER is:

A Joint Venture:

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of Joint Venturer's authorized agent)
(Attach evidence of authority to sign)

Name: _____

Title: _____

Business Address: _____

Phone Number: _____

Fax Number: _____

Email Address: _____

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of Joint Venturer's authorized agent)
(Attach evidence of authority to sign)

Name: _____

Title: _____

Business Address: _____

Phone Number: _____

Fax Number: _____

Email Address: _____

Phone and Facsimile and Address for receipt of official communications:

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture shall be in the manner indicated above.)

EXHIBIT "A"
COST SUMMARY TABLE FOR "BASE BID"

| Item No. | Description | Estimated Quantity | Unit | Unit Price | Extended Price |
|----------------------------------|--|--------------------|------|------------|----------------|
| 1 | Mobilization/Demobilization | 1 | LS | \$ | \$ |
| 2 | Surveying and Field Engineering | 1 | LS | \$ | \$ |
| 3 | Performance Bond | 1 | LS | \$ | \$ |
| 4 | Payment Bond | 1 | LS | \$ | \$ |
| 5 | Health and Safety & Air Monitoring | 1 | LS | \$ | \$ |
| 6 | Soil Erosion and Sediment Control | 1 | LS | \$ | \$ |
| 7 | Clearing and Grubbing | 1 | LS | \$ | \$ |
| 8 | Remove Existing Geomembrane and Subgrade Preparation | 1 | LS | \$ | \$ |
| 9 | Place Grading Fill | 2,000 | CY | \$ | \$ |
| 10 | Install Geosynthetic Clay Liner | 28,000 | SY | \$ | \$ |
| 11 | Install New Geomembrane | 28,500 | SY | \$ | \$ |
| 12 | Install Geocomposite Drainage Layer | 27,500 | SY | \$ | \$ |
| 13 | Place Cover Soil | 27,000 | SY | \$ | \$ |
| 14 | Place Vegetative Support Layer | 26,000 | SY | \$ | \$ |
| 15 ^d | In-Situ "Hot Spot" Treatment Field Verification Program (FVP) | 10 | DAY | \$ | \$ |
| 15-A | In-Situ "Hot Spot" Treatment Post-FVP Stand-by Time | 20 | DAY | \$ | \$ |
| 16 | In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations | 37 | DAY | \$ | \$ |
| 17 | Install New Sheet Pile Wall | 25,000 | SF | \$ | \$ |
| 18 | Construct Perimeter Access Roads | 1 | LS | \$ | \$ |
| 19 | Place Stone Aggregate and Rip Rap | 1,000 | CY | \$ | \$ |
| 20 | Install 12-in-dia Road Culvert | 35 | LF | \$ | \$ |
| 21 | Demolition | 1 | LS | \$ | \$ |
| 22 | Well Decommissioning | 19 | EA | \$ | \$ |
| 23 | Install New Perimeter Chain Link Fence | 1,000 | LF | \$ | \$ |
| 24 | Install Pre-Engineered Metal Building | 1 | LS | \$ | \$ |
| 25 | Install New Groundwater Recovery Wells | 10 | EA | \$ | \$ |
| 26 | Install Groundwater Recovery System Carrier Pipes | 3,500 | LF | \$ | \$ |
| 27 | Install New Piezometers | 19 | EA | \$ | \$ |
| 28 | Install Non-Woven Geotextiles | 3,500 | SY | \$ | \$ |
| 29 | In-Situ "Hot Spot" Treatment VOC Off-Gas Activated Carbon Usage | 1,750,000 | LBS | \$ | \$ |
| 29-A | In-Situ "Hot Spot" Treatment VOC Off-Gas Collection, Treatment, and Discharge System | 47 | DAY | \$ | \$ |
| 30 | Management and Disposal of Surface/Decon Water | 30,000 | GAL | \$ | \$ |
| 31 | Management and Disposal of Groundwater | 20,000 | GAL | \$ | \$ |
| TOTAL CONSTRUCTION COST = | | | | \$ | |

- (a) Prices shall be computed in accordance with Section 01025 of the Specifications.
- (b) BIDDER acknowledges that the quantities presented herein are not guaranteed, and payment will be based on actual installed/completed quantities, as determined and provided for in the Contract Documents.
- (c) CONTRACTOR shall undertake and complete the specified In-Situ "Hot Spot" Treatment Field Verification Program to the GROUP's satisfaction, and CONTRACTOR shall implement all reasonable, feasible efforts, it and/or the REMEDIAL DESIGNER deem necessary, to achieve the specified performance criteria.
- (d) Abbreviated units are as follows:
- | | | |
|---------------|------------------|------------------|
| LS = Lump Sum | CY = Cubic Yard | SY = Square Yard |
| EA = Each | LF = Linear Feet | SF = Square Feet |
| GAL = Gallon | LBS = Pounds | DAY = Work Day |

EXHIBIT "B"

COST SUMMARY TABLE FOR "ALTERNATE BID - A"

| Item No. | Description | Estimated Quantity | Unit | Unit Price | Extended Price |
|----------|---|--------------------|------|------------|----------------|
| 16-A | In-Situ "Hot Spot" Treatment Excavation, Off-Site Disposal, and Backfill of Treated Mass | 5,063 | TON | \$ | \$ |
| | | | | | |

Notes:

- (a) This "Alternate Bid - A" may be invoked at the GROUP discretion, but ONLY after the In-Situ "Hot Spot" Treatment field verification program, which is covered under Bid Item No. 15 in the "Base Bid", has been completed, and the results and findings of this field verification program have been evaluated.
- (b) CONTRACTOR shall undertake and complete the specified In-Situ "Hot Spot" Treatment Field Verification Program ("Base Bid" Bid Item No. 15) to the GROUP's satisfaction, and CONTRACTOR shall implement all reasonable, feasible efforts, it and/or the REMEDIAL DESIGNER deem necessary, to achieve the specified performance criteria.
- (c) If the GROUP elects to invoke this "Alternate Bid - A", CONTRACTOR shall implement its In-Situ "Hot Spot" Treatment Production Operations (under Bid Item No. 16), and then excavate and dispose of the treated mass of material off-Site at an approved/authorized disposal facility.
- (d) Prices shall be computed in accordance with Section 01025 of the Specifications.
- (e) BIDDER acknowledges that the quantities presented herein are not guaranteed, and payment will be based on actual installed/completed quantities, as determined and provided for in the Contract Documents.
- (f) Abbreviated units are as follows:

| | | |
|------------------------------|------------------|------------------|
| LS = Lump Sum | CY = Cubic Yard | SY = Square Yard |
| EA = Each | LF = Linear Feet | SF = Square Feet |
| GAL = Gallon | LBS = Pounds | DAY = Work Day |
| TON = Tons (i.e., 2,000 LBS) | | |

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EXHIBIT "C"

SUBCONTRACTOR LIST

PROJECT: 216 Paterson Plank Road Operable Unit No. 2 (OU-2) Final Remedy

CONTRACTOR: _____

SUBCONTRACTORS:

(1) Name: _____
Address: _____
Telephone: _____ Fax: _____ Email: _____
Contact Person: _____
Type of Work: _____
Percentage of Total Contract: _____

(2) Name: _____
Address: _____
Telephone: _____ Fax: _____ Email: _____
Contact Person: _____
Type of Work: _____
Percentage of Total Contract: _____

(3) Name: _____
Address: _____
Telephone: _____ Fax: _____ Email: _____
Contact Person: _____
Type of Work: _____
Percentage of Total Contract: _____

(4) Name: _____
Address: _____
Telephone: _____ Fax: _____ Email: _____
Contact Person: _____
Type of Work: _____
Percentage of Total Contract: _____

(5) Name: _____
Address: _____
Telephone: _____ Fax: _____ Email: _____
Contact Person: _____
Type of Work: _____
Percentage of Total Contract: _____

January 2008
943-6222

216 Paterson Plank Road Site
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EXHIBIT "D"

BASELINE CONSTRUCTION PROGRESS SCHEDULE

(To be attached by BIDDER/CONTRACTOR)

January 2008
943-6222

216 Paterson Plank Road Site
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EXHIBIT “F”

BID PROPOSAL ASSUMPTIONS

(To be attached by BIDDER/CONTRACTOR)

SECTION 00600

CONSTRUCTION AGREEMENT

This AGREEMENT, dated as of the __ day of _____ in the year 2008, is a Contract by and between the 216 PATERSON PLANK ROAD COOPERATING PRP GROUP (hereinafter referred to as the GROUP) and _____ (hereinafter referred to as CONTRACTOR) with its principal office at _____.

RECITALS

- A. The GROUP anticipates the Work will involve implementation of the Operable Unit No. 2 (OU-2) Final Remedy at the 216 Paterson Plank Road Superfund Site (hereinafter referred to as the Site) located in Carlstadt, Bergen County, New Jersey;
- B. This Contract was prepared based on a Record of Decision (ROD) for OU-2, issued by the United States Environmental Protection Agency (USEPA), dated August 12, 2002. In addition, the Work, as specified in the Contract Documents, will be performed in accordance with the stipulated provisions set forth in a Consent Decree, dated September 20, 2004, between the GROUP and USEPA.
- C. CONTRACTOR is capable and willing to perform the Work, as specified by this Contract, for the GROUP, as more particularly described herein.

The GROUP and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – AUTHORIZED REPRESENTATIVES

- 1.1 The GROUP's REPRESENTATIVE: The GROUP's REPRESENTATIVE for purposes of this Agreement is:

Mr. P. Stephen Finn, C.Eng.
Facility Coordinator
Golder Associates Inc
300 Century Parkway, Suite C
Mt. Laurel, New Jersey 08054

- 1.2 The REMEDIAL DESIGNER: The REMEDIAL DESIGNER for purposes of this Agreement is:

Mr. Mark F. McNeilly, P.E.
Practice Leader and Associate
Golder Associates Inc.
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102

- 1.3 CONTRACTOR's Representative(s): CONTRACTOR's Authorized Representative for purposes of this Agreement is:

Mr. Gregory S. Tunstall, P.E.
ENTACT Environmental Services
102 Chesley Drive
Jamestown Building, Floor 1A
Media, Pennsylvania 19603

ARTICLE 2 – STATEMENT OF WORK

- 2.1 CONTRACTOR shall complete all Work, as specified or indicated in the Contract Documents, as described in Article 6.0 hereof. The Work is the entire completed construction of the whole and each separate part to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials, products, and equipment into the construction, all as required by the Contract Documents.
- 2.2 CONTRACTOR accepts the relationship of trust and confidence established between it and the GROUP by this construction arrangement, as set forth in the Contract Documents. CONTRACTOR agrees to furnish the Work set forth herein and agrees to furnish efficient business administration, superintendence, and coordination of all Subcontractors and Vendors and to use its best efforts to complete the Work in an expeditious and economical manner consistent with the interests of the GROUP.

ARTICLE 3 – CONTRACT TIME

- 3.1 Time is of the essence in this Agreement. CONTRACTOR shall complete all Work within the specified Contract Time. See Section 00800 of the Specifications for additional details relative to the commencement and completion dates for this Contract.
- 3.2 No Work shall be performed at the Site prior to the commencement date, as stipulated in the GROUP's "Notice to Proceed" (NTP) to CONTRACTOR. The Contract Time shall expire on the date stipulated in Section 00800 of the Specifications.
- 3.3 When CONTRACTOR considers the entire Work ready for its intended use, CONTRACTOR shall notify GROUP'S REPRESENTATIVE in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) by submitting to GROUP'S REPRESENTATIVE a Certificate of Substantial Completion, for GROUP'S REPRESENTATIVE's approval. If, after receiving such notice, GROUP'S REPRESENTATIVE concludes that the Work is not substantially complete, GROUP'S REPRESENTATIVE shall within ten (10) days, notify CONTRACTOR in writing, stating the reasons therefore. GROUP'S REPRESENTATIVE's decision shall be final and shall bar any subsequent claim

concerning the date of Substantial Completion unless CONTRACTOR, within five (5) days of receipt of GROUP'S REPRESENTATIVE's decision, protests GROUP'S REPRESENTATIVE's decision in writing.

- 3.4 Upon attainment of Final Completion, the CONTRACTOR shall submit a Certificate of Final Completion to the GROUP'S REPRESENTATIVE notifying GROUP'S REPRESENTATIVE that the entire Work is complete, GROUP'S REPRESENTATIVE will make a final inspection with CONTRACTOR and GROUP'S REPRESENTATIVE will sign off the Certificate if Work is complete or will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.
- 3.5 Final Completion shall have occurred when all Work has been completed, such that it meets its intended purpose and USEPA issues its formal, final approval of the completed Work.
- 3.6 If CONTRACTOR fails to reach Final Completion within the specified Contract Time and as a result the GROUP is assessed stipulated penalties, pursuant to its Consent Order with USEPA, CONTRACTOR shall pay liquidated damages equal to the stipulated penalties incorporated into the GROUP's Consent Decree with USEPA. Liquidated damages shall be paid to the GROUP, as they are incurred or at the GROUP's election, or may be deducted from any amounts/payment owed/due to CONTRACTOR.

ARTICLE 4 – CONTRACT PRICE AND RETAINAGE

- 4.1 As full and complete compensation for the Work, the GROUP shall pay CONTRACTOR in the manner provided by General Condition GC-09, and upon final completion and acceptance of all Work in accordance with the Contract Documents.
- 4.2 The GROUP's obligation to pay any sum due CONTRACTOR is upon the condition that CONTRACTOR is not in material default under this Contract. The GROUP's obligation to pay each "*Payment Request*" shall be subject to and conditional upon receipt of Bills Paid Affidavits and Waiver of Liens forms, unless the GROUP agrees otherwise in writing, by CONTRACTOR and all SUBCONTRACTORS performing portions of the Work covered by said "*Payment Requests*", and other proof reasonably satisfactory to the GROUP that all claims for labor, services, and materials for which CONTRACTOR has been paid by the GROUP have been paid or satisfied in full. See Section 00310 of the Specifications for Bills Paid Affidavit and Waiver of Liens form.
- 4.3 The GROUP shall pay during the performance of the Work ninety-percent (90%) of portions of the Work, as approved by the GROUP, included under each "*Request for Payment*", and the GROUP will withhold remaining ten-percent (10%), as retainage.
- 4.4 The GROUP shall hold such retainage percentages as security for the faithful performance, by CONTRACTOR, of all conditions, covenants, and requirements specified and provided for in this Contract Agreement. Furthermore, such retainage shall be payable to CONTRACTOR upon: a) the GROUP having received completed and signed Bills Paid

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Affidavits and Waiver of Liens forms by CONTRACTOR all SUBCONTRACTORS performing portions of the Work; and b) the latter of (i) thirty (30) consecutive calendar days following Substantial Completion and (ii) delivery to the GROUP of all items required by this Contract.

- 4.5 Retainage shall be paid upon certification of CONTRACTOR's completion of the Work, as specified by the Contract Documents, except that the GROUP may withhold an amount adequate to cover: a) costs of all defective, rejected, or incomplete Work; b) all damages, losses, or expenses incurred by the GROUP on account of defective, rejected, or incomplete Work or CONTRACTOR's performance of the Work; and c) all claims, demands made, or liens filed by any person or entity against the GROUP, the Work or the Project Site on account of defective or incomplete Work, CONTRACTOR's performance of the Work or failure to pay Subcontractors, laborers, or Suppliers. The amount of retainage shall in no way limit CONTRACTOR's liability under this Agreement.

ARTICLE 5 – CONTRACTOR'S REPRESENTATIONS

- 5.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, Site, locality, availability of labor, union or non-union practices, and all local conditions and any federal, state, or local laws and regulations including, but not limited to CERCLA and the National Contingency Plan (NCP), that in any manner may affect cost, progress, performance, or furnishing of the Work.
- 5.2 CONTRACTOR has given the GROUP written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents, prior to execution of this Agreement, and the written resolution thereof by the GROUP's REPRESENTATIVE is acceptable to CONTRACTOR.
- 5.3 CONTRACTOR has the relevant experience and is qualified to perform the services defined/described in this Contract, and is properly/adequately staffed, organized, and financed to perform such services. CONTRACTOR shall act as an independent contractor to the GROUP, and shall not be misconstrued to be an agent of the GROUP in performing its services, maintaining control over its employees, and managing/coordinating all SUBCONTRACTORS, suppliers, and vendors.
- 5.4 CONTRACTOR has inspected the Site prior to award of this Agreement, and agrees that the areas for parking and storage and lay down of materials, and access to the Site are acceptable to CONTRACTOR, and that the GROUP will not be required to alter or interrupt any on-going operations at the Site.

ARTICLE 6 – CONTRACT DOCUMENTS

- 6.1 The Contract Documents, which comprise the entire Agreement between the GROUP and CONTRACTOR concerning the Work, consist of the following sections:
- Commercial Documents
 - Technical Documents

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6.2 The Commercial section of this Agreement includes:

- This Agreement, and all fully executed Riders and Addenda to this Agreement, if any, at time of execution;
- Completed and signed copies of all requisite Bid Forms (See Section 00300, Bid Forms, of the Specifications);
- Section 00100, Instructions to Bidders, of the Specifications;
- Section 01010, Summary of Remedial Work, of the Specifications;
- Section 01025, Measurement and Payment, of the Specifications;
- Section 00700, General Conditions, of the Specifications;
- Section 00800, Supplementary Conditions, of the Specification;
- Section 00310, Bills Paid Affidavits and Waiver of Liens, of the Specifications;
- Sections 00610 and 00620, Performance and Payment Bonds, of the Specifications;
- CONTRACTOR's completed Cost Summary table for the "Base Bid" and "Alternate Bid - A" (see Exhibits "A" and "B" of the Bid Forms);
- CONTRACTOR's list of SUBCONTRACTORS (see Exhibit "C" to Bid Forms);
- CONTRACTOR's Baseline Construction Progress Schedule, if submitted with Bid Proposal (see Exhibit "D" to Bid Forms);
- CONTRACTOR's identified equipment and personnel unit rates (see Exhibit "E" to the Bid Forms);
- CONTRACTOR's Bid Proposal assumptions (see Exhibit "F" to the Bid Forms);
- Copies of the CONTRACTOR's and its designated SUBCONTRACTORS Certificates of Insurance; and
- Consent Decree, executed by USEPA and the GROUP, dated September 30, 2004, for implementation of the OU-2 Final Remedy.

6.3 The Technical section of this Agreement includes:

- Contract Drawings (See Section 00210 of Specifications for a List of Contract Drawings);
- Technical Specifications;
- All modified/revised Contract Drawings and/or Technical Specifications issued to CONTRACTOR under fully executed Addenda to this Agreement;
- Construction Quality Assurance Plan (CQAP); and
- Record of Decision, issued by the USEPA, dated August 12, 2002, for the OU-2 Final Remedy.

6.4 There are no Contract Documents other than those listed above. The above listed Contract Documents are fully part of this Agreement, as if hereto attached or herein referenced, and form the Contract between the parties hereto.

6.5 The Contract Documents may only be amended, modified, or supplemented, as provided in the General Conditions (see Section 00700 of Specifications).

ARTICLE 7 – MISCELLANEOUS

7.1 Assignment:

- A. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound. In particular, CONTRACTOR may not assign its right to recover any moneys that may become due from the GROUP without the consent of the GROUP (except to the extent that the effect of this restriction may be limited by law).
- B. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents. Nothing in this Agreement shall limit the GROUP's right to freely assign or delegate any rights or obligations under this Agreement to any entity controlling, controlled by, or under common control with the GROUP.
- C. The GROUP and CONTRACTOR each binds itself, its partners, successors, assignees, and legal, authorized representatives/agents to the other party hereto, its partners, successors, assignees, and legal, authorized representatives/agents in respect to all covenants, agreements, and obligations contained in the Contract Documents.

7.2 Severability:

- A. The provisions of this Agreement and the Contract Documents shall be deemed severable, and the invalidity or unenforceability of any provision shall not affect the validity and enforceability of the other provisions hereof. If any provision of this Agreement, or other Contract Documents, is unenforceable for any reason whatsoever, that provision shall be appropriately limited and given effect to the extent that it may be enforceable.

7.3 No Waiver by the GROUP:

- A. No act or failure to act to exercise the rights enjoyed by the GROUP to demand the obligations owed to the GROUP by CONTRACTOR shall constitute a waiver of any right enjoyed or obligation owed.

7.4 Confidentiality:

- A. All information and documents (whether originals or copies) relating to the Work, whether created or produced by CONTRACTOR, its SUBCONTRACTORS, suppliers, vendors, or other persons/parties and whether in draft or final form, shall be the property of the GROUP, and shall be kept confidential. CONTRACTOR recognizes and acknowledges that such documents and information constitute valuable, special and unique property of the GROUP and its members.
- B. CONTRACTOR shall not give, show or describe any such confidential documents or information to any party, except to authorized representatives/agents of the GROUP, for any reason or purpose whatsoever, other than as required by its performance of its

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obligations under this Agreement; provided, however, that CONTRACTOR may disclose confidential documents or information to its employees, SUBCONTRACTORS, vendors, and suppliers who require said information to perform CONTRACTOR's obligations hereunder and who have agreed in writing to be bound by the terms of this Article 7.4 of this Agreement.

- C. Obligations of Article 7.4 to this Agreement do not apply to any information or documents that: a) are or become part of the public domain without breach of any obligation of confidentiality owed to the GROUP or its members; or b) are required to be publicly disclosed under law or by order of a court or administrative agency.
- D. Notwithstanding any other provisions of this Agreement, CONTRACTOR shall be liable, without limitation, for any and all damages arising out of any breach, by CONTRACTOR, of this Article 7.4 to this Agreement.
- E. CONTRACTOR shall ensure provisions benefiting the GROUP and its members and similar to this Article 7.4 to this Agreement are incorporated into all Contracts CONTRACTOR enters into with its SUBCONTRACTORS, vendors, and/or suppliers.

ARTICLE 8 – DECLARATIONS AND EXECUTION

IN WITNESS WHEREOF, the parties hereto have caused this AGREEMENT to be executed in five (5) original copies on the day and year first above written.

216 Paterson Plank Road Cooperating PRP Group

(CONTRACTOR)

By: _____
(Signature)

By: _____
(Signature)

Its: _____
(Typed Name and Title)

Its: _____
(Typed Name and Title)

Date: _____

Date: _____

(If CONTRACTOR is a corporation, attach evidence of authority to sign.)

CONTRACTOR's New Jersey License No. _____.

***** END OF SECTION *****

SECTION 00610

PERFORMANCE BOND

KNOW ALL BY THESE PRESENTS,

That _____, as CONTRACTOR, and _____, as Surety, hereinafter collectively called "CONTRACTOR", are held and firmly bound to the 216 Paterson Plank Road Cooperating PRP Group, as "the GROUP", in the sum of _____ for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said CONTRACTOR has been awarded and is about to enter into the annexed Agreement for implementation of the Operable unit No. 2 (OU-2) Final Remedy at the 216 Paterson Plank Road Superfund Site located in Carlstadt, Bergen County, New Jersey ("Agreement") dated _____, 2008 with the GROUP to perform the Work as specified or indicated in said Agreement and all attachments thereto, including the Contract Documents.

Now therefore, if said CONTRACTOR shall perform all the requirements of said Agreement required to be performed on its part, at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

Provided, that any alterations in the Work to be done or the materials to be furnished, or changes in the time of completion or performance, which may be made pursuant to the terms of said Agreement, shall not in any way release said CONTRACTOR or said Surety thereunder, nor shall any extensions of time granted under the provisions of said Agreement release either said CONTRACTOR or said Surety, and notice of such alterations or extensions of said Agreement is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____, 2008

(CONTRACTOR, with Seal)

(Surety, with Seal)

By: _____
(Signature)

By: _____
(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

*** END OF SECTION ***

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SECTION 00620

PAYMENT BOND

KNOW ALL BY THESE PRESENTS,

That _____, as CONTRACTOR, and _____, as Surety, hereinafter collectively called "CONTRACTOR", are held and firmly bound to the 216 Paterson Plank Road Cooperating PRP Group, as "the GROUP", in the sum of _____ for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said CONTRACTOR has been awarded and is about to enter into the annexed Agreement for implementation of the Operable Unit No. 2 (OU-2) Final Remedy at the 216 Paterson Plank Road Superfund Site located in Carlstadt, Bergen County, New Jersey ("Agreement") dated _____, 2008 with the GROUP to perform the Work as specified or indicated in said Agreement and all attachments thereto, including the Contract Documents.

Now therefore, if said CONTRACTOR, or SUBCONTRACTOR, fails to pay for any materials, equipment, products, or other supplies, or for rental of same, used in connection with the performance of Work contracted to be done, or for amounts due under applicable State Law for any Work or labor thereon, said Surety shall pay for the same in an amount not exceeding the sum specified above, and in the event suit is brought upon this Bond, a reasonable attorney's fee to be fixed by the Court. This Bond shall inure to the benefit of any persons, companies, or corporations entitled to file claims under applicable State Law.

Provided, that any alterations in the Work to be done or the materials to be furnished, or changes in the time of completion or performance, which may be made pursuant to the terms of said Agreement, shall not in any way release said CONTRACTOR or said Surety hereunder, nor shall any extensions of time granted under the provisions of said Agreement release either said CONTRACTOR or said Surety, and notice of such alterations or extensions of said Agreement is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____, 2008

(CONTRACTOR, with Seal)

(Surety, with Seal)

By: _____
(Signature)

By: _____
(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

*** END OF SECTION ***

SECTION 00700

GENERAL CONDITIONS

These General Conditions, as listed below, amend or supplement the terms, conditions, covenants, requirements, and other provisions stipulated in the executed Construction Agreement. All terms, conditions, covenants, requirements, and provisions, which are not so amended or supplemented, shall remain in full force and effect.

GC-1. DEFINITIONS

- A. See Section 01015 of the Specifications for meanings and definitions of various common terms used throughout and incorporated into the Contract Documents.

GC-2. OWNERSHIP AND USE OF CONTRACT DOCUMENTS

- A. CONTRACTOR shall be furnished five (5) complete copies of the Contract Documents. Additional copies shall be furnished upon request, and at the cost of reproduction.
- B. CONTRACTOR shall have no ownership rights in any of the Contract Documents, including the Contract Drawings and Specifications.
- C. By executing this Contract, CONTRACTOR represents that it has: a) examined the Contract Documents thoroughly; b) visited the Site to become familiar with local conditions that may in any manner affect cost, progress, or performance of the Work; c) become familiar with all federal, state and local laws, ordinances, rules regulations that may in any manner affect cost, progress, or performance of the Work; and d) studied and carefully correlated CONTRACTOR's observations with the Contract Documents.
- D. The Contract Documents comprise the entire Contract between the GROUP and CONTRACTOR concerning the Work. The Contract Documents are complimentary, and what is required by one is as binding as if requested by all.
- E. It is the intent of the Contract Documents to describe a functionally complete Project, or part thereof, to be constructed. Any work, materials, products, or equipment that may reasonably be inferred from the Contract Documents, as being required to produce the intended result, shall be supplied whether or not specified. When words that have a well-known technical or trade meaning are used to describe the Work, materials, products, or equipment, such words shall be interpreted in accordance with that meaning. References to standard specifications, manuals, or codes of any technical society, organization, or association or to the laws or regulations of any governmental authority shall mean the latest standard specification, manual, code, laws, or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated.

- F. The GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall issue such written clarifications and interpretations of the requirements of the Contract Documents, as may be deemed necessary. Such clarifications and interpretations shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.
- G. If, during the performance of the Work, CONTRACTOR finds any conflicts, errors, or discrepancies in the Contract Documents, CONTRACTOR shall immediately report said conflicts, errors, and/or discrepancies to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER in writing. Before proceeding with the Work affected thereby, CONTRACTOR shall obtain a written interpretation or clarification from the REMEDIAL DESIGNER. Any work done before the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER render their decisions is at the CONTRACTOR's sole risk.
- H. If specific means, methods, technique, sequences, or procedures of construction are indicated in or required by the Contract Documents, CONTRACTOR may use a substitute means, methods, sequence, technique, or procedure of construction acceptable to the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, provided CONTRACTOR submits sufficient information to allow the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents, and said substitute proposed is consistent with the remedy described in the Record of Decision.
- I. The GROUP's REPRESENTATIVE shall be allowed a reasonable time, but not less than seven (7) days, to consult with the REMEDIAL DESIGNER to evaluate each proposed substitute. The GROUP's REPRESENTATIVE shall be the final judge of acceptability and no substitute shall be ordered, installed, or used without the GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's prior written acceptance, which shall be evidenced by either a change order or other appropriate documentation. CONTRACTOR may be required to furnish, at the CONTRACTOR's expense, a special performance guarantee or other surety with respect to any substitute.
- J. The GROUP's REPRESENTATIVE shall record the time required by the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the GROUP's REPRESENTATIVE accepts a proposed substitute, CONTRACTOR shall reimburse the GROUP's REPRESENTATIVE for the charges of the GROUP's REPRESENTATIVE, REMEDIAL DESIGNER, and REMEDIAL DESIGNER's consultants for evaluating each proposed substitute.
- K. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed", "as approved", or terms of like effect or import are used or the adjectives "reasonable," "suitable", "acceptable," "proper", or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the GROUP's REPRESENTATIVE and REMEDIAL

DESIGNER as to the Work, it is intended that such requirement, direction, review or judgment shall be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective shall not relieve the CONTRACTOR of its duty and responsibility to supervise or direct the furnishing or performance of the Work.

- L. CONTRACTOR may reproduce and distribute to its employees, SUBCONTRACTORS, vendors, and suppliers all Contract Drawings, Specifications, and data necessary to execute the Work. CONTRACTOR shall assure all of its employees and its SUBCONTRACTORS, vendors, and suppliers work only from the latest revision of issued-for-construction Contract Documents, including Contract Drawings and Specifications. CONTRACTOR shall maintain and make available to the GROUP's REPRESENTATIVE an up-to-date file of all Contract Documents, including all Contract Drawings and Specifications.

GC-3. SUPERVISION AND CONSTRUCTION PROCEDURES

- A. CONTRACTOR and its SUBCONTRACTORS shall not be allowed to perform any Work on-Site without the full-time, on-Site presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL ENGINEER.
- B. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. CONTRACTOR shall be responsible to see that the completed work complies with the Contract Document.
- C. The CONTRACTOR shall be solely responsible for the acts and omissions of the CONTRACTOR's employees, SUBCONTRACTORS, vendors, suppliers, and their representatives, agents, and employees, and other persons performing any of the Work.
- D. CONTRACTOR shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the GROUP, the GROUP's REPRESENTATIVE, or the REMEDIAL DESIGNER by inspections, tests, favorable reviews, or the lack thereof, required or performed by persons other than CONTRACTOR.
- E. CONTRACTOR shall designate in writing a competent full-time resident superintendent, satisfactory to the GROUP and the REMEDIAL DESIGNER, to supervise and direct the Work, and this superintendent shall be on-Site at all times during working hours with full authority to act on behalf of CONTRACTOR. CONTRACTOR shall also provide an adequate staff for the proper coordination and expediting of its work. Should, in the opinion of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, any language barrier exist between the superintendent and the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, CONTRACTOR will, at its own expense, employ a qualified interpreter.

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- F. CONTRACTOR's designated superintendent shall not be replaced without advance written notice to and approved by the GROUP's REPRESENTATIVE. CONTRACTOR shall provide a management chart and a list of personnel comprising the superintending staff and their areas of responsibility. All written communications given to the superintendent or the superintending staff shall be as binding as if given to the CONTRACTOR.
- G. The superintendent shall remain on-Site not less than eight (8) hours-per-day, five (5) days-per-week until termination of the Contract in accordance with the Contract Documents, unless the Work is suspended or stopped by the GROUP or the GROUP's REPRESENTATIVE. The superintendent shall not be employed or used on any other project during the course of the Work.
- H. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction, as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons, work, or property at the Site or adjacent thereto and except as otherwise indicated in the Contract Documents, all Work at the Site shall be performed during regular working hours and the CONTRACTOR shall not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without the GROUP's REPRESENTATIVE's written consent given after at least forty-eight (48) hours prior written notice.
- I. CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment, and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, startup and completion of the Work.
- J. All work shall be performed in a skillful, professional, and workmanlike manner.
- K. CONTRACTOR shall at all times enforce strict discipline and good order among the CONTRACTOR's employees and shall not employ any unfit person or anyone not skilled in the task assigned to him/her. The GROUP's REPRESENTATIVE may, in writing, require CONTRACTOR to remove from the Project any employee it deems incompetent, careless, or otherwise objectionable.

GC-4. SUBCONTRACTS

- A. Unless specifically permitted otherwise, CONTRACTOR shall perform with its own organization and with the assistance of workmen under its immediate superintendence Work amounting to not less than fifty-one-percent (51%) of the total Contract value.
- B. CONTRACTOR shall not employ any SUBCONTRACTOR, supplier, vendor, or other person(s) or organization(s) against whom the GROUP and/or the GROUP's REPRESENTATIVE may have reasonable objection. CONTRACTOR shall not be required to employ any SUBCONTRACTOR, supplier, vendor, or other person(s) or organization(s) to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

- C. CONTRACTOR shall not execute an agreement with any SUBCONTRACTOR, vendors, and/or suppliers or permit any SUBCONTRACTORS, vendors, or suppliers to perform any work included in this Contract until the GROUP has approved said SUBCONTRACTOR in writing.
- D. When the Contract Documents require the identity of certain SUBCONTRACTORS, suppliers or other persons or organizations, including those who are to furnish the principal items of materials, products, and equipment, to be submitted for acceptance to the GROUP's REPRESENTATIVE prior to the effective date of the Contract and if the CONTRACTOR has submitted a list thereof in accordance with the Contract Documents, the GROUP's REPRESENTATIVE's acceptance, in writing, of any such SUBCONTRACTORS, supplier, vendors, or other persons or organizations so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. No acceptance by the GROUP of any such SUBCONTRACTOR, supplier, vendor, or other person or organization shall constitute a waiver of any right of the GROUP to reject defective Work.
- E. CONTRACTOR shall be fully and solely responsible to the GROUP for all acts, errors, and omissions of the SUBCONTRACTORS, suppliers, vendors, and other persons and organizations performing or furnishing any portion of the Work under a Contract with CONTRACTOR, just as CONTRACTOR is responsible for the CONTRACTOR's own acts, errors, and omissions.
- F. All work performed for CONTRACTOR by a SUBCONTRACTOR shall be pursuant to an appropriate agreement between CONTRACTOR and the SUBCONTRACTOR that specifically binds SUBCONTRACTOR to the applicable terms and conditions of the Contract Documents. CONTRACTOR shall pay each SUBCONTRACTOR a just share of any insurance moneys received by the CONTRACTOR on account of losses under policies issued.
- G. Nothing contained in the Contract Documents is intended to create, nor shall it create, any contractual relationship between the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL ENGINEER, or any of their agents, employees, or representatives and any SUBCONTRACTOR.

GC-5. OTHER CONTRACTS

- A. The GROUP reserves the right to issue or enter into other Contracts in connection with this Work. CONTRACTOR shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and/or coordinate its work with theirs.
- B. The GROUP may award, or may have awarded other Contracts for additional work, and CONTRACTOR shall cooperate fully with such other Contractors, by scheduling its Work with that to be performed under other Contracts, as may be directed by the GROUP. CONTRACTOR shall not permit or commit any act, which will interfere with the performance of Work by any other Contractor, as scheduled.

- C. Wherever Work being done by other Contractors is contiguous to Work covered by this Contract, the respective rights of the various interests involved shall be established by the GROUP's REPRESENTATIVE to secure the completion of the various portions of the Work in general harmony.

GC-6. FITTING AND COORDINATION OF THE WORK

- A. CONTRACTOR shall be responsible for the proper fitting of all Work and for the coordination of the operations of all trades, SUBCONTRACTORS, vendors, suppliers, and labor forces engaged on this Contract. CONTRACTOR shall be prepared to guarantee to each of its SUBCONTRACTORS the locations and measurements, which they may require for the fitting of their Work to all surrounding Work.
- B. CONTRACTOR shall, at its own expense, effect all cutting, fitting, or patching of its work required to make the same conform to the Contract Drawings and Specifications, and except with the consent of the GROUP, not to cut or otherwise alter the Work of any other Contractor(s).

GC-7. RESPONSIBILITY OF CONTRACTOR

- A. If, through acts or neglect on the part of CONTRACTOR, any other Contractor or SUBCONTRACTOR suffers a loss or damage in connection with the Work, CONTRACTOR shall settle with such other Contractor or SUBCONTRACTOR by agreement or arbitration.
- B. If such other Contractor or SUBCONTRACTOR asserts any claim against the GROUP on account of any damage alleged to have been so sustained during performance of the Work, the GROUP will notify CONTRACTOR, who shall defend at its own expense any suit based upon such claim, and in any judgment or claims against the GROUP shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and will in all other respects, including, but not limited to, attorney's fees and court costs, hold harmless the GROUP and REMEDIAL DESIGNER.

GC-8. CONSTRUCTION PROGRESS SCHEDULES

- A. CONTRACTOR shall (unless a Pre-Award Construction Progress Schedule has been submitted and approved by the GROUP) prepare and submit within seven (7) calendar days following execution of this Agreement a realistic, detailed Construction Progress Schedule for review and approval by the GROUP, which shows the Contractors proposed sequence of construction and includes start/finish dates and durations for each and every planned construction activity, as specified by the Contract Documents.
- B. Construction Progress Schedules shall include (at a minimum):
 - 1) The project name, number, and geographic location;

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- 2) The Contract time, commencement date, substantial and final completion date, and periods of shutdown, if any;
- 3) Listings of all Work items with periods of activity for Work segment; and
- 4) The total estimated Contract cost for each Work segment, and its percentage of the total Contract cost.

- C. *“Requests for Payment”* will not be processed or approved for payment until such time updated Construction Progress Schedules are submitted to and approved by the GROUP’s REPRESENTATIVE.
- D. CONTRACTOR shall reviewed or updated said Construction Progress Schedule on a bi-weekly basis (i.e., every 2 weeks), unless directed otherwise by the GROUP’s REPRESENTATIVE.
- E. See Section 01041 of the Specification for additional requirements relative to preparation of and submission of all Construction Progress Schedules.

GC-9. PAYMENTS

- A. CONTRACTOR shall submit *“Requests for Payment”* to the GROUP’s REPRESENTATIVE on a monthly basis. Formats and contents of each *“Request for Payment”* shall be established and mutually agreed to, prior to submission of CONTRACTOR’s initial *“Request for Payment”*.
- B. At a minimum, all *“requests for Payment”* shall include, but not be limited to, the following: a) full details, on an item by item basis, as to the Work completed with the requested payment period; b) estimates of the percentage completed for each item, both to date and during the month; and c) amounts invoiced, item by item and totaled, both to date and during the month.
- C. Within thirty (30) consecutive calendar days of receipt of each submitted *“Request for Payment”*, the GROUP’s REPRESENTATIVE will review the submitted *“Requests for Payment”*, and identify, discuss, and resolve all controversial items/issues, if any, with CONTRACTOR, as necessary. If there are no controversial issues/items or said controversial items/issues have be mutually resolved, the GROUP’s REPRESENTATIVE will approve said *“Requests for Payment”*, and issues said *“Requests for Payment”* to the GROUP for payment
- D. Upon approval of each *“Request for Payment”*, the GROUP will pay CONTRACTOR ninety-percent (90%) of the total value for each approved *“Request for Payment”*, and withhold ten-percent (10%) as retainage. The amount of retainage shall in no way limit CONTRACTOR’s liability under this Agreement.
- E. The GROUP shall hold such retainage percentages as security for the faithful performance, by CONTRACTOR, of all conditions, covenants, and requirements specified and provided for in this Contract Agreement. Furthermore, such retainage shall be payable to CONTRACTOR upon: a) the GROUP having received completed and signed Bills Paid Affidavits and Waiver of Liens forms by CONTRACTOR all SUBCONTRACTORS performing portions of the Work; and b) the latter of (i) thirty

(30) consecutive calendar days following Final Completion and (ii) delivery to the GROUP of all items required by this Contract.

- F. The GROUP may withhold or decline to pay CONTRACTOR, because of, but not limited to, any of the following reasons:
- 1) Costs of all defective, rejected, or incomplete Work;
 - 2) All damages, losses, or expenses incurred by the GROUP on account of defective, rejected, or incomplete Work or CONTRACTOR's performance of the Work;
 - 3) All claims, demands made, or liens filed by any person or entity against the GROUP, the Work or the Project Site on account of defective or incomplete Work, CONTRACTOR's performance of the Work or failure to pay Subcontractors, laborers, or Suppliers;
 - 4) Failure of CONTRACTOR to make payments to SUBCONTRACTORs, suppliers, and/or vendors;
 - 5) Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price;
 - 6) Damages to the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or other Contractors;
 - 7) Failure to comply with CONTRACTOR's approved Construction Progress Schedule; and
 - 8) Failure to perform the Work in accordance with the Contract documents;

When the circumstances resulting in non-payment to CONTRACTOR are removed to the satisfaction of the GROUP, payment shall be made for amounts withheld because of them.

- G. CONTRACTOR warrants and guarantees that title to all work, labor, materials, and equipment covered by any "*Request for Payment*", whether incorporated in the Project or not, shall pass to the GROUP free and clear of all liens no later than the time of payment.
- H. The GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER shall determine actual quantities and classifications of unit price work performed and documented by CONTRACTOR. The CONTRACTOR shall review the GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's preliminary determinations of such quantities. The GROUP's REPRESENTATIVE's determination thereof shall be final and binding upon CONTRACTOR unless, within five (5) days after the date of any such decision, CONTRACTOR delivers to the GROUP's REPRESENTATIVE written notice of its intention to appeal the determination.
- I. With each "*Request for Payment*", CONTRACTOR and each of its lower tier SUBCONTRACTORs, suppliers, and vendors seeking payment, must provide completed Bills Paid Affidavit and Waiver of Liens forms. See Section 00310 of the Specifications for the Bills Paid Affidavit and Waiver of Liens form.
- J. Receipt, by the GROUP's REPRESENTATIVE, of all completed Bills Paid Affidavit and Waiver of Liens form shall be a condition precedent to payment of any "*Requests*

for Payment”, and the thirty (30) day time period for payment will not commence until the GROUP has received said completed Bills Paid Affidavit and Waiver of Liens forms from all parties seeking payment under each *“Request for Payment”*.

GC-10. CHANGES IN THE WORK

- A. The GROUP may make changes in the Work, as required to be performed by CONTRACTOR under this Contract, by making additions thereto, or by omitting Work therefrom, without invalidating the Contract.
- B. Except for the purpose of affording protection against any emergency endangering life or property, CONTRACTOR shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of this Contract, unless in pursuance of a written order from the GROUP authorizing CONTRACTOR to proceed with the change. No claim for an adjustment of the Contract price will be valid unless so ordered.
- C. CONTRACTOR agrees to perform any of the aforementioned changed work, along with all other required work found under the Contract, without delay and in accordance with good construction practices.
- D. The changes outlined above may be made without relieving or releasing CONTRACTOR from any of its obligations under the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is provided otherwise.
- E. If applicable unit prices are contained in the Agreement (established as a result of either a Unit Price Bid or a Supplemental Schedule of Unit Prices), the GROUP may order CONTRACTOR to proceed with desired changes in the work, the value of such change to be determined by the measured quantities involved and the applicable unit prices specified in the Contract.
- F. If applicable unit prices are not contained in the Agreement, the GROUP will, before ordering CONTRACTOR to proceed with desired changes, request an itemized proposal from CONTRACTOR covering the Work involved in the change after which the procedure shall be as follows:
 - 1) If the change in the Work involves additional Work, the procedure shall be as follows:
 - a. If the proposal is acceptable, the GROUP will prepare a Change Order in accordance therewith for acceptance by CONTRACTOR; or
 - b. If the proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the GROUP may order CONTRACTOR to proceed with the Work on a Cost-Plus-Limited Basis. A Cost-Plus-Limited Basis is defined as the net cost of the Work to CONTRACTOR plus an allowance to

cover overhead and profit, as stipulated below, the total cost not to exceed a specified amount. The following allowances for overhead and profit are hereby established as reasonable and shall apply:

- i. Fifteen-percent (15%) of the net cost of all labor furnished by CONTRACTOR. For all labor CONTRACTOR shall receive the rate of wage actually paid, as shown by its certified payroll. For all foremen in direct charge of the work, CONTRACTOR shall receive the actual wage paid the foremen, as shown on its certified payroll. No part of the salary or expense of anyone above the grade of foreman and having general supervision of the Work will be included in the labor item.
 - ii. In the case of extra Work by a SUBCONTRACTOR, the SUBCONTRACTOR shall compute its cost for the extra Work, to which it shall add fifteen-percent (15%) maximum and CONTRACTOR shall be allowed an additional five-percent (5%) of the SUBCONTRACTOR's costs for the extra Work.
 - iii. For the cost of all insurance and taxes imposed by law on labor employed on the Work, CONTRACTOR shall receive the actual amount paid.
 - iv. Ten-percent (10%) of the net cost of all materials used by CONTRACTOR, less any allowable cash or early payment discounts, delivered on the Work, including delivery charges, as shown by original receipted bills.
 - v. Rental rates for any power operated machinery, trucks, or equipment, which it may be found necessary to use on Cost-Plus-Limited work shall be negotiated between the GROUP and CONTRACTOR. These rates shall be reasonable and shall be based on those rental rates prevailing in the area where such Work is to be done, and they shall be agreed upon in writing before the Work is begun. In no case shall the rental rates exceed the rates set up in the current edition of the "Associated Equipment Distributors Compilation of Rental Rates" and shall include all repairs, fuel, lubricants, taxes, insurance, depreciation, storage and all attachments complete, ready to operate, but excluding operators. Operators and oilers (i.e., tenders) shall be paid as stated hereinabove for labor.
 - vi. No percentage for overhead and profit shall be added to the amounts of equipment rental prices agreed upon, but the price agreed upon shall be the total compensation allowed for use of such equipment.
 - vii. All disputes regarding Work performed on a Cost-Plus-Limited Basis under this section are subject to the appeal procedures outlined in the General Condition GC-54.
- 2) If changes in the Work requires a reduction in the Work involved, the procedure shall be as follows:

- a. If the proposal is acceptable, the GROUP will prepare a Change Order in accordance therewith for acceptance by CONTRACTOR; or
- b. If the proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the GROUP's REPRESENTATIVE will fix the cost value of the credit. The GROUP may then order CONTRACTOR to proceed with the work through a Change Order. Should CONTRACTOR disagree with the cost value of the credit as fixed by the GROUP's REPRESENTATIVE, it may appeal the same in accordance with the procedures outlined in the General Condition GC-54.

G. Each Change Order shall include in its final form:

- 1) A detailed description of the change in the work;
- 2) CONTRACTOR's proposal (if any) or a confirmed copy thereof;
- 3) Definite statements as to the resulting change in the Contract price and/or time; and
- 4) Statement that all Work involved in the change shall be performed in accordance with Contract requirements, except as modified by the Change Order.

H. CONTRACTOR shall not take advantage of any obvious errors in the specifications or any such error in the Contract Drawings or other Contract Documents. Any obvious errors or discrepancies in or between any of the Contract Documents shall be immediately reported to the GROUP's REPRESENTATIVE, who will make such corrections and interpretations as may be deemed necessary for the completion of the Work in a satisfactory and acceptable manner.

GC-11. CHANGES IN SUBSURFACE CONDITIONS

- A. In the event CONTRACTOR, during the process of the Work, encounters conditions which materially differ from those shown on or implied on the Contract Drawings or in the Specifications, or those determined during Contractor's inspection of the Site, prior to the Bid, and further, if these changed conditions cause a loss to CONTRACTOR, CONTRACTOR shall be entitled to submit a request for additional compensation in accordance with of the General Condition GC-12.
- B. CONTRACTOR shall not be entitled to submit a request for additional compensation for changed conditions that vary seasonally, including but not limited to groundwater fluctuations, freezing/frost, etc.
- C. Changed existing utility locations from those shown or implied by the Contract Drawings shall be the basis for a claim except as provided under General Condition GC-42.
- D. Notice of any changed conditions must be given to the GROUP's REPRESENTATIVE as soon as the event occurs, so that the GROUP's REPRESENTATIVE will have an opportunity to investigate the same and make any alterations, which in the discretion of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER may be necessary. Such notice is a material condition, which must be adhered to by CONTRACTOR.

- E. Prior to the GROUP's REPRESENTATIVE giving any consideration to CONTRACTOR's request for additional compensation, CONTRACTOR shall be obligated to submit a detailed description of such changes.
- F. The REMEDIAL DESIGNER will investigate the facts and will notify the GROUP whether the actual conditions encountered by CONTRACTOR are or are not materially different from those shown or implied on the Contract Drawings and in the Specifications.
- G. In the event of a favorable decision by the GROUP, CONTRACTOR shall be entitled to additional compensation and the amount of the additional compensation shall be determined in accordance with the provisions of the General Condition GC-12.
- H. In the event of any unfavorable decision by the GROUP, CONTRACTOR shall have the rights to contest said decision as provided for under the provisions of this Contract.

GC-12. CLAIMS FOR ADDITIONAL COSTS AND/OR TIME

- A. All claims between the parties, including all claims for additional compensation and/or additional time, arising out of, or in any way related to this Contract and/or the performance of the same, or its interpretation, except those disputes covered by Federal Labor Standards Provisions shall within ten (10) days of the event or action giving rise to such claims be presented to the GROUP's REPRESENTATIVE. All papers pertaining to such claims shall be filed in triplicate. Such notice need not detail the amount of the claim but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, CONTRACTOR shall proceed with the Work, as directed. Any claim not presented within the time limit specified in this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is to be given within ten (10) days of its commencement, the claim will be considered only for period commencing ten (10) days prior to receipt by the GROUP's REPRESENTATIVE of notice thereof. CONTRACTOR shall in no case allow any claim or dispute to delay the Work.
- B. Within ten (10) days after the initial notice of a claim, as described above, CONTRACTOR shall prepare and submit its claim in final form complete with costs and schedule impacts and all supporting information/data. Should the claim be of a continuing nature, CONTRACTOR shall submitted its claim in final form, as of the last day of each month during its continuance.
- C. As soon as practicable after the final submission of all information the GROUP will make a determination of any submitted claims. Said decision of the GROUP shall be a condition precedent to any further action on the claim. However, upon certification in writing by the claimant that the claim has been submitted in its final form, the GROUP will be obliged to render a decision on said claim within sixty (60) days of the date of said certification. Should the GROUP fail to render its decision within the aforementioned sixty (60) day period, its decision will not be a condition precedent to any further action on the part of the claimant.

- D. There shall be no added compensation paid for delay to CONTRACTOR unless the GROUP causes said delay by material breach of this Contract, and compliance with the foregoing notice provisions shall be a condition precedent to the prosecution of any such claim.
- E. Claims for additional compensation for additional Work, due to alleged errors in ground elevations, contour lines, or benchmarks, will not be considered unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which results, or would result, in handling more material, or performing more Work, than would be reasonably estimated from the Contract Drawings.
- F. If, on the basis of the available evidence, the GROUP determines that an adjustment of the Contract Price and/or time is justifiable, the procedure shall be as provided in General Conditions GC-10, GC-11, GC-12, and GC-13.
- G. In the event of an unfavorable decision by the GROUP, CONTRACTOR shall have the right to contest said decision, as provided for under the provisions of this Contract.

GC-13. TERMINATION, DELAYS AND EXTENSIONS, AND LIQUIDATED DAMAGES

- A. Termination of Contract: For its own convenience the GROUP may, at any time prior to the issuance of a Notice to Proceed (NTP), void this Contract by giving unequivocal and unconditional written notice of such voidance to CONTRACTOR, and in the event of such voidance the GROUP will not be liable to CONTRACTOR for any claims or losses, including anticipated loss of profit and moneys expended in anticipation of performance of the Work specified by this Contract.

At any time subsequent to the NTP, the GROUP may, at its convenience, terminate the Contract by giving unequivocal and unconditional written notice of such termination to CONTRACTOR. In the event of such termination by the GROUP, the GROUP will be responsible to CONTRACTOR for the following moneys only, which moneys shall be subject to legitimate charges of the GROUP against CONTRACTOR:

- 1) All reasonable costs incurred by CONTRACTOR in performance of or in anticipation of performance of the Contract provided CONTRACTOR shall take all reasonable steps to mitigate such damages including the return and/or re-sale of materials ordered; and
- 2) A mark-up of ten-percent (10%) for profit and ten-percent (10%) for overhead on the reasonable cost of the Work completed and in place, in accordance with the Contract Drawings and Specifications, to the date of termination. CONTRACTOR shall remain responsible for the Work completed, in accordance with the Contract provisions.

Should any work under this contract be subject to, or terminated by the action of any third party, governmental unit/body/agency, or court due to any reason, including

environmental or ecological, the rights of CONTRACTOR to recover from the GROUP shall be determined as set forth above.

The GROUP may give notice, in writing, to CONTRACTOR and his surety of any material breach of this Contract by CONTRACTOR to include, but not be limited to, any of the following:

- 1) Failure to begin the Work under this Contract within the time specified;
- 2) Failure to perform the Work with sufficient workmen, equipment, or materials to insure the prompt completion of said Work;
- 3) Unsuitable performance of the Work or failure to perform any additional Work to correct such rejected, defective, or unsuitable Work;
- 4) Neglecting or refusing to remove material rejected, as defective and unsuitable;
- 5) Discontinuing the suitable prosecution of the Work for a period of seventy-two (72) hours, excluding Sundays and holidays, without written authorization from the GROUP's REPRESENTATIVE;
- 6) Failure to commence discontinued Work within forty-eight (48) hours following notice to resume such discontinued Work (excluding Sundays and holidays);
- 7) Becoming insolvent or declared bankrupt, or committing any act of bankruptcy or insolvency;
- 8) Allowing any final judgment to stand against CONTRACTOR unsatisfied for periods equal to or greater than ten (10) calendar days;
- 9) Making any assignment for the benefit of creditors; and
- 10) Violating any terms, conditions, covenants, and/or provisions presented in the Contract Documents.

CONTRACTOR's Surety, within a period of ten (10) calendar days after such notice of default, shall take all appropriate and necessary actions to correct said material breaches of Contract. Should said actions fail to meet with the approval of the GROUP, the GROUP may, at its discretion, order the Surety to complete the Work or, without violating the Contract, take the prosecution of the Work out of the hands of said Contractor and Surety.

The GROUP may appropriate or use any or all materials and equipment on the ground as may be suitable and acceptable and may enter into an agreement, either by negotiation or public letting, for the completion of said Contract according to the terms and provisions thereof, or use such other methods or combinations thereof, as in its opinion will be required or desirable for the completion of said Contract in an acceptable manner. All costs and charges incurred by the GROUP, together with the cost of completing the work under Contract, shall be deducted from any monies due or which may become due to said CONTRACTOR. In case such expense shall exceed the sum which and would have been payable under the Contract, CONTRACTOR and the Surety shall be liable and shall pay to the GROUP the amount of said excess.

- B. Excusable Delays and Extensions of Time: The right of CONTRACTOR to proceed shall not be terminated nor shall CONTRACTOR be charged with liquidated damages for any delays in the completion of the Work due:

- 1) To any acts of the government, including controls or requisitioning of materials, equipment, tools, or by labor, by reason of war, National Defense, or any other national emergency;
- 2) To any acts of the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or agents of the GROUP; or injunction or litigation against the GROUP;
- 3) To causes not reasonably foreseeable by the both parties to this Contract at the time of the execution of this Contract, which are beyond the control and without the fault or negligence of CONTRACTOR, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of some other contract with the GROUP, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions; and
- 4) To any delay of any SUBCONTRACTOR occasioned by any of the causes specified above.

If CONTRACTOR believes it has experienced an excusable delay and requests and extension of time, CONTRACTOR shall promptly notify the GROUP in writing within ten (10) days of CONTRACTOR becoming knowledgeable of such delays, and show appropriate cause for such delays. Upon receipt of such notification and all necessary supporting data, the GROUP will ascertain the facts, causes, and extent of such delays. If, upon the basis of the facts and the terms of this Contract, the delay is properly excusable, the GROUP will extend the time for completing the Work for a period of time commensurate with the period of excusable delay.

No claim for damages or any claim other than for an extension of time and for reimbursement of additional direct costs actually incurred, as a result of such excusable delay, as herein provided shall be made or asserted against the GROUP by reason of any delay.

- C. Liquidated Damages for Delay: If the Work is not completed within the time stipulated in Supplementary Condition SC-1, including any extensions of time for excusable delays, as herein provided, CONTRACTOR shall pay to the GROUP as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) for each calendar day of delay, until the Work is completed, the amount as set forth in Supplementary Condition SC-2, and CONTRACTOR and its sureties shall be liable to the GROUP for the amount thereof.

GC-14. RIGHT TO STOP OR SUSPEND THE WORK

- A. If the Work is defective or if CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment or fails to furnish or perform the Work in such a way that the completed work shall conform to the Contract Documents, the GROUP's REPRESENTATIVE may order CONTRACTOR to stop the Work or any portion thereof until the cause for such order has been eliminated. This right of the GROUP to stop work shall not give rise to any duty on the part of the GROUP or the GROUP's REPRESENTATIVE to exercise this right for the benefit of CONTRACTOR or any other party.

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- B. The GROUP may at any time and without cause suspend this Contract or any portion thereof for a period of not more than one hundred eighty (180) days by notice in writing to CONTRACTOR that shall fix the date on which Work shall be resumed. CONTRACTOR shall resume Work on the date so fixed, and may be entitled to an extension of the Contract time in accordance General Conditions GC-12 and GC-13.
- C. If the performance of all or part of the Work is suspended for an unreasonable period of time by an act of the GROUP or the GROUP's REPRESENTATIVE or by failure of the GROUP or the GROUP's REPRESENTATIVE to act within the time specified in this Contract, the CONTRACTOR shall be entitled to an equitable adjustment, per the conditions of this Contract. No equitable adjustment shall be allowed for any failures by CONTRACTOR, including failure of supervision, which subsequently resulted in the Work being suspended.
- D. No claims for an equitable adjustment shall be allowed for: 1) any costs incurred prior to the date CONTRACTOR was notified by the GROUP in writing of the act or failure to act involved, but this requirement shall not apply as to a claim resulting from a suspension order; 2) any claim for an extension of time required for performance, unless within twenty (20) days after the act or failure to act involved, CONTRACTOR submits to the GROUP a written statement setting forth, as then practicable the extent of such claimed time extension; and 3) unless the claims for a time extension in an amount stated are asserted in writing within twenty (20) days after the end of such suspension, delay, or interruption.

GC-15. ASSIGNMENT OR NOVATION

- A. CONTRACTOR shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the GROUP; provided, however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the GROUP. In the event of any assignments made to banks, trust companies, or other financial institutions, CONTRACTOR shall provide written notice to the GROUP.
- B. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of CONTRACTOR's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered and materials, tools, and equipment supplied for the performance of the Work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

GC-16. GROUP'S REPRESENTATIVE AND REMEDIAL DESIGNER'S AUTHORITY

- A. The GROUP's REPRESENTATIVE will decide all non-technical questions, which may arise in relation to the Work and construction thereof, and the REMEDIAL DESIGNER will decide all technical questions, which may arise in relation to the Work and the construction thereof.

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- B. The GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's estimates, interpretations, and decisions shall be final and conclusive, except as herein otherwise expressly provided.
- C. In case any question shall arise between the parties hereto relative to said Contract, the determination or decision of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall be a condition precedent to the right of CONTRACTOR to receive any money or payment for work under this Contract affected in any manner or to any extent by such question.

GC-17. TECHNICAL SPECIFICATIONS AND CONTRACT DRAWINGS

- A. Anything mentioned in the Technical Specifications and not shown on the Contract Drawings or shown on the Contract Drawings and not mentioned in the Technical Specifications shall be of like effect, as if shown on or mentioned in both.
- B. In cases of difference between the Contract Drawings and Technical Specifications, the Technical Specifications shall govern.

GC-18. SHOP DRAWINGS

- A. All required shop drawings, machinery details, layout drawings, working drawings, material, and equipment descriptions, etc., shall be submitted to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, in four (4) copies, for review sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. CONTRACTOR shall allow four (4) weeks for checking from the date of receipt by the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.
- B. CONTRACTOR, with the approval of the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, may submit manufacturer's literature as a substitute for, or supplement to, the requisite shop drawings, etc. The minimum size for any submission shall be 8-1/2" x 11" and the maximum size shall be the size of the Contract Drawings. All shop drawings, etc. and/or printed matter submitted shall be properly identified by project and specific application with reference to Contract Drawing number and specification items.
- C. No construction, purchase, delivery, installation, or Work shall be done or made on any part or feature of this Contract, which is dependent upon shop drawing review, until such review has been received from the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. If CONTRACTOR proceeds without reviewed shop drawings, it shall be at its own risk. No claim by CONTRACTOR, for extension of the Contract time will be granted by reason of its failure in this respect.
- D. Shop drawings, etc., or printed matter shall give all dimensions, sizes, etc. to enable the REMEDIAL DESIGNER to determine suitability of the construction, installation, material or layout for the purposes intended. Where needed for clarity, the drawings shall include outline, sectional views and detailed working dimensions and

designations of the kind of material, machine work, finish, etc., required. The drawings to be submitted shall be coordinated by CONTRACTOR with any other drawings previously reviewed, with the design and function of any equipment or structure and the Contract Drawings.

- E. Any shop drawings, etc., submitted without CONTRACTOR's stamp of approval will not be considered and will be returned to CONTRACTOR for proper resubmission. By approving and submitting shop drawings, etc., CONTRACTOR thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so and that he has checked and coordinated each shop drawing, etc. with the requirements of the work and of the Contract Documents.
- F. If any drawings show variations from the requirements of the Contract because of standard shop practice and/or other reasons, CONTRACTOR shall make specific mention of such variation in its letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of the contract price and/or time; otherwise, CONTRACTOR will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been reviewed.
- G. After review, the submittals will be stamped "No Exceptions Taken", "Make Corrections Noted", "Amend-Resubmit", or "Rejected-Resubmit". Drawings marked "No Exceptions Taken" and "Make Corrections Noted" will be returned to CONTRACTOR for its use and distribution to his suppliers and/or Subcontractors. In the case of those stamped "Amend-Resubmit" or "Rejected-Resubmit", two (2) prints will be returned to CONTRACTOR who shall make all indicated corrections and resubmit four (4) new copies of the revised submittal.
- H. In any submission that is noted as "No Exceptions Taken" or "Make Corrections Noted", the review shall not extend to details or dimensions and shall not relieve CONTRACTOR from his responsibility for compliance with the Contract Drawings and Specifications.
- I. When CONTRACTOR proposes a revision to a previously submitted shop drawing, etc., four (4) copies shall be resubmitted for review. This re-submittal shall clearly indicate, in a revision block, the date, description, and location of the revision. The letter of transmittal shall state the reasons for the revision.
- J. CONTRACTOR shall furnish as many copies of the submittals, as is necessary for the proper coordination of the work, and shall maintain a complete set of the reviewed submissions at the Site of the Work at all times.
- K. Upon the final acceptance of the project, CONTRACTOR shall furnish the GROUP, at the GROUP'S option, with a complete set of shop drawing tracings and/or reproducible cloth reproductions of the shop drawing tracings.
- L. There will be no direct payment made for any of the above submittals, or reproducible drawings if required, but the cost thereof shall be considered as included in the general cost of the work.

- M. See Section 01300 of the Specification for additional requirements.

GC-19. REQUESTS FOR SUPPLEMENTARY INFORMATION

- A. It shall be the responsibility of CONTRACTOR to make timely requests of the GROUP for any additional information not already in its possession which should be furnished by the GROUP under the terms of this Contract, and which it will require in the planning and execution of the work. Such requests may be submitted from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.
- B. Each request shall be in writing, and list the various items and latest date by which each will be required by CONTRACTOR. The first list shall be submitted within two (2) weeks after Contract award, and shall be as complete as possible at that time. CONTRACTOR shall, if requested, furnish promptly any assistance and information the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER may require in responding to these requests for supplementary information.
- C. CONTRACTOR shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this General Condition.

GC-20. MATERIALS AND WORKMANSHIP

- A. Unless otherwise specifically provided for in the Specifications, all workmanship, equipment, materials and articles incorporated in the Work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles, or workmanship are referred to in the Specifications as "equal to" or "equivalent to" any particular standard, the REMEDIAL DESIGNER will solely decide the question of equality.
- B. All work performed and all materials furnished shall be in conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances shown on the Contract Drawings or indicated in the Specifications.
- C. CONTRACTOR shall furnish to the GROUP for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work.
- D. Machinery, mechanical and other equipment, materials, or articles installed or used without such prior approval shall be at the risk of subsequent rejection.
- E. Materials specified by reference to the number or symbol of a specific standard, such as an ASTM Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement

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thereto in effect on the date of the Request for Bids, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as modified in the Specifications, shall have full force and effect, as though printed therein.

- F. CONTRACTOR shall employ only competent and skillful personnel to do the Work. Whenever the GROUP's REPRESENTATIVE notifies CONTRACTOR, in writing, that any person on-Site is, in its opinion, incompetent, unskillful or disorderly, CONTRACTOR shall forthwith remove such person and shall not again employ him/her on any part of the Work without the written consent of the GROUP'S REPRESENTATIVE. In no event shall notifications (or lack thereof) of the GROUP'S REPRESENTATIVE under this section modify or alleviate CONTRACTOR'S obligation to employ only competent and skillful personnel to do the Work
- G. The GROUP may stop any Work or any part of the Work under the Contract, if the GROUP believes that methods or conditions are such that unsatisfactory Work might result, if improper materials or workmanship is being used, or if unsafe conditions exist or will be created.
- H. In the event the materials furnished or the Work performed deviates from the requirements of the Contract Drawings and Specifications, but, in the opinion of the GROUP, constitutes substantial performance, the GROUP may accept the same. Should the deviation in question result in a savings to CONTRACTOR the GROUP will be entitled to a credit in the full amount of said savings. Should the deviation in question result in additional costs to CONTRACTOR, the GROUP will not be liable to CONTRACTOR for such additional cost.
- I. If the materials or the finished product in which the materials are used or the work performed are not in conformity with the Contract Drawings and Specifications and have resulted in an inferior or unsatisfactory product, the Work and materials shall be removed and replaced or otherwise corrected by and at the expense of CONTRACTOR.

GC-21. SAMPLES, CERTIFICATES, AND TESTS

- A. CONTRACTOR shall submit all samples, materials, certified test reports, materials certificates, certificates of compliance, affidavits, etc., as called for in the Contract Documents or required by the REMEDIAL DESIGNER, promptly after award of the Contract and acceptance of CONTRACTOR's bonds. No such materials and/or equipment, etc., shall be manufactured or delivered to the Site, except at CONTRACTOR's own risk, until the required samples, certificates, tests, etc., have been approved in writing by the REMEDIAL DESIGNER. Any delays in the Work caused by late or improper submission of the above for approval shall not be considered just cause for an extension of the Contract time.
- B. Samples: Unless otherwise specified, CONTRACTOR shall furnish the required samples without charge, and shall provide every facility for the securing of material samples. CONTRACTOR shall provide means and assist in the verification of all scales, measures, and other devices that it operates. Samples to be submitted will be taken by the REMEDIAL DESIGNER or a laboratory approved by the GROUP, unless

otherwise specified. All materials being used shall be subject to re-sampling and testing at any time during their preparation and/or use.

- C. All samples submitted by CONTRACTOR shall be properly identified to include, but not be limited to, the project name, project number, item number, and description of material, name of the producer, place of origin, and other detailed information which will assist the REMEDIAL DESIGNER passing upon the acceptability of the sample. Certified test reports, materials certificates and/or certificates of compliance required to be submitted with the samples or if permitted in lieu of samples, shall conform to the requirements stated hereafter.
- D. Certified Test Reports: A certified test report shall be a document containing a list of the dimensional, chemical, metallurgical, electrical, and physical results obtained from an actual test of the materials involved, and shall certify that the materials meet the requirements of the Contract Drawings and Specifications, and at a minimum shall also include the following information:
- 1) Item number and description of material;
 - 2) Date of manufacture;
 - 3) Date of testing;
 - 4) Name of organization to whom the material is consigned;
 - 5) Quality of material represented, such as batch, lot, group, etc.;
 - 6) Means of identifying the consignment, such as label, marking, lot number, etc.;
 - 7) Date and method of shipment; and
 - 8) Name of organization performing tests.

Certified test reports shall be signed by an authorized and responsible agent for the organization manufacturing the material, and they shall be duly notarized.

- E. Material Certificates: Material certificates shall be documents certifying that the materials, components, and equipment furnished, conform to all requirements of the Contract Drawings and Specifications. At a minimum, said material certificates shall include the following information:
- 1) Project to which the material is consigned;
 - 2) Name of Contractor to whom material is supplied;
 - 3) Item number and description of material;
 - 4) Quantity of material represented by the certificate;
 - 5) Means of identifying the consignment, such as label, marking, lot numbers, etc.;
and
 - 6) Date and method of shipment.

Material certificates shall be signed by an authorized and responsible agent for the organization supplying the material, and they shall be duly notarized.

- F. Certificates of Compliance: A certificate of compliance shall be a document certifying that the materials, components, and equipment covered by the previously submitted certified test report and materials certificate have been installed in the work, and that

they conform to all the requirements of the Contract Drawings and Specifications. At a minimum, the following information shall also be required on these documents:

- 1) Project number;
- 2) Item number and description of material;
- 3) Quantity represented by the certificate; and
- 4) Name of manufacturer.

Certificates of compliance shall be signed by an authorized and responsible agent for the prime Contractor, and shall be duly notarized.

- G. Tests: Tests, as required by the Specifications, will be made in accordance with standards in effect at the time of bidding, unless otherwise specified on the Contract Documents. Representative preliminary samples of the material proposed for use shall be submitted, without charge, by CONTRACTOR or producer for examination and tested in accordance with specified methods. All materials being used are subject to test or rejection at any time during their preparation and use. Materials will be rejected by the REMEDIAL DESIGNER whenever, in his judgment, they fail to meet the requirements of the specifications. The GROUP reserves the right to retest all materials which have been tested and accepted at the source of supply, after the same have been delivered, and to reject all materials which, when retested, do not meet the requirements of the specifications.
- H. Approval/Acceptance: Approval of any materials shall be general only and shall not constitute a waiver of the GROUP's right to demand full compliance with Contract requirements. After actual deliveries, the REMEDIAL DESIGNER will have such check tests made, as it deems necessary, in each instance and may reject materials and equipment and accessories that fail to meet any check tests may cause their removal and replacement by proper materials or demand and secure such reparation by CONTRACTOR as is equitable.
- I. The REMEDIAL DESIGNER may accept a material or combination of materials and therefore waive non-complying test results provided that all of the following conditions are met:
- 1) Results of prior and subsequent series of tests of the material or materials from the same source or sources are found satisfactory;
 - 2) Incidence and degree of nonconformance with the specification requirements are, in the REMEDIAL DESIGNER's judgment, within reasonable and practical limits;
 - 3) CONTRACTOR has diligently exercised material controls consistent with good practices in the REMEDIAL DESIGNER's judgment; and
 - 4) No adverse effect on the value or serviceability of the completed Work could result.
- J. The REMEDIAL DESIGNER may, at his discretion, waive testing of minor quantities of material when such material is obtained from sources that have previously and consistently met specification requirements as demonstrated by testing.

K. Sample, Certificate, and Test Costs:

- 1) CONTRACTOR shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the REMEDIAL DESIGNER, and CONTRACTOR shall pay all other testing costs of said samples;
- 2) CONTRACTOR shall assume all costs of retesting materials which fail to meet Contract requirements; and
- 3) CONTRACTOR shall assume all costs of testing materials offered in substitution for those found deficient or for those specified.

GC-22. PERMITS AND CODES

- A. CONTRACTOR shall obtain and pay for all required permits, approvals, and licenses required for the Work unless already obtained. CONTRACTOR shall pay all government charges and inspection fees necessary for the prosecution of the Work and applicable at the time of opening bids or, if there are no bids, on the effective date of the Contract. CONTRACTOR shall pay all charges of utility owners for connections to the Work. Contractor will notify the GROUP's Representative before seeking any work permits, approvals or licenses.
- B. CONTRACTOR shall give all notices required by and shall observe and comply with all Federal and State laws and Local by-laws, ordinances and regulations in any manner affecting the conduct of the work, and all such orders or decrees as may exist at present and those which may be enacted later, of bodies or tribunals having any jurisdiction or authority over the work.
- C. CONTRACTOR shall indemnify and save harmless the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER and all of their officers, representatives, agents, and servants against any claim or liability arising from or based on the violation of any such law, bylaw, ordinance, regulation, order of decree, whether by its employees.
- D. All construction, work, and/or utility installations shall comply with all applicable ordinances and/or codes including any and all written waivers thereto.
- E. Before commencing any Work, CONTRACTOR shall examine the Contract Drawings and Specifications for compliance with applicable ordinances, codes, etc., and shall immediately report any discrepancy to the GROUP. Where the requirements of the Contract Drawings and Specifications fail to comply with such applicable ordinances, codes, etc., the GROUP will adjust the Contract by Change Order to conform to such ordinances, codes, etc., (unless waivers in writing covering the differences have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.
- F. Should CONTRACTOR fail to observe the foregoing provisions and proceed with the construction of work and/or install any utility at variance with any applicable ordinance, code, etc., including any written waivers (notwithstanding the fact that such installation is in compliance with the Contract Drawings and Specifications),

CONTRACTOR shall remove such work without cost to the GROUP, but a Change Order will be issued to cover only the excess cost CONTRACTOR would have been entitled to receive, if the change had been made before CONTRACTOR commenced Work on the item involved.

- G. Unless otherwise specified, CONTRACTOR shall, at his own expense, secure and pay to the appropriate department of the local, state, and federal government agency fees or charges for all permits including, but not limited to, those required for street pavements, sidewalks, sheds, removal of abandoned water taps, sealing of connection drains, pavement cuts, buildings, electrical plumbing, water, gas, and sewer permits, etc., required by the regulatory body or any of its agencies.
- H. CONTRACTOR shall comply with applicable local, state, federal laws, ordinances, codes, etc., governing the transportation and disposal of surplus excavation, materials debris and rubbish on or off the Site, and commit no trespass on any public or private property in any operation due to or connected with the Work under this Contract.
- I. All non-hazardous samples and by-products from sampling processes in connection with the Work shall be disposed of by CONTRACTOR in accordance with applicable federal, state, and locale rules, regulations, laws, and codes.
- J. Any and all waste materials generated in connection with the Work, including samples and by-products from sampling processes that cannot be introduced back into the environment under applicable law without additional treatment, empty containers, residues, and contaminated media, and all hazardous wastes or radioactive wastes related to the Work, shall be packaged in accordance with applicable law by CONTRACTOR. CONTRACTOR shall identify appropriate alternatives for off-site treatment, storage or disposal of the material at facilities that are, as applicable, approved by EPA and state and local regulatory agencies. The GROUP shall select the final alternative, and CONTRACTOR shall not make any independent determination relating to the selection of a treatment, storage, or disposal facility.
- K. As the GROUP's agent, CONTRACTOR shall provide or subcontract for personnel, equipment and materials required for the transportation of the material to the selected facility. As the GROUP's agent, CONTRACTOR shall comply with all applicable law and shall ensure that, prior to transport, all waste is properly described, packaged, marked and labeled, and is in proper condition for transportation according to all applicable standards and regulations, including without limitations the standards and regulations of the United States Department of Transportation ("DOT"), EPA, and NJDEP. CONTRACTOR shall procure all necessary permits and licenses and other forms of documentation required relating to the waste material to be transported, treated, stored, disposed or processed hereunder. CONTRACTOR shall promptly furnish the GROUP with copies of all such permits, licenses or other documents.
- L. CONTRACTOR shall sign all necessary manifests for the disposal of the material. CONTRACTOR will provide copies of completed manifest documents to the GROUP.

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GC-23. TAXES

- A. CONTRACTOR shall pay all sales, consumer, use, service, excise, payroll, and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the place of the Project that are applicable during the performance of the Work.

GC-24. CARE OF WORK

- A. CONTRACTOR acknowledges that the GROUP is relying upon the accuracy, competence, and completeness of Work rendered under this Agreement.
- B. CONTRACTOR warrants that the Work performed hereunder shall be of good quality, free from material fault or defect; be performed in accordance with, at minimum, the reasonable and customary codes and standards of good practice prevailing in the environmental services industry at the time of performance; be performed strictly in accordance with the RI/FS AOC; be performed by properly qualified and trained personnel; and conform to the specifications of the Contract Documents.
- C. CONTRACTOR warrants that it is familiar with the type of problems typically encountered in performing this type of work, and that Contractor has the capability, experience, and resources to perform the Work in a professional and timely manner consistent with the Contract Documents.
- D. CONTRACTOR shall keep any area where Work is being performed free from unnecessary accumulation of waste materials and rubbish from CONTRACTOR or any Subcontractor, and in a neat and orderly condition.
- E. CONTRACTOR shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the GROUP.
- F. Materials shall be stored so as to insure the preservation of their quality and fitness for the work and shall be located so as to facilitate prompt inspection. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces and not on the ground and, when directed, shall be placed in weatherproof buildings.
- G. Stored materials, even though approved before storage, shall be inspected prior to their use in the work and shall meet the requirements of the specifications at the time it is proposed to use them.
- H. CONTRACTOR shall at his sole expense and without any additional cost to the GROUP provide watchmen and/or other security measures as may be reasonably required to properly protect and care for materials and work completed, and to otherwise prevent property damage and/or personal injury.
- I. In an emergency affecting the safety of life or property, including adjoining property, CONTRACTOR, without special instructions or authorization from the GROUP, is

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authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. CONTRACTOR shall likewise act, if instructed to do so by the GROUP. Any compensation claimed by CONTRACTOR on account of such emergency work will be determined by the GROUP, as provided in General Conditions GC-10 and GC-12.

- J. CONTRACTOR shall avoid damages as a result of its operations to existing sidewalks, streets, curbs, pavements, utilities (except those, if any, which are to be replaced or removed), adjoining property, etc., and shall at his own expense completely repair, in kind, any damage thereto caused by its operations.
- K. CONTRACTOR shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the Site, which may be in any way affected by the excavations or other operations connected with the construction of this Contract.
- L. CONTRACTOR shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. CONTRACTOR shall indemnify and save harmless the GROUP, the GROUP's REPRESENTATIVES, and the REMEDIAL DESIGNER from any damages for which the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER may become liable in consequence of such injury or damage to the Work or adjoining and adjacent structures and/or their premises.

GC-25. ACCIDENT PREVENTION

- A. CONTRACTOR shall exercise proper precautions and safety measures at all times for the protection of persons and/or property and shall be responsible for all injuries and/or damages to all persons and/or property, either on or off the site, which occur as a result of his prosecution of the work under this Contract.
- B. The safety provisions of all applicable local, state, and federal laws, and building and construction codes, shall be observed and CONTRACTOR shall take or cause to be taken such additional safety and health measures as the GROUP may determine to be reasonably necessary.
- C. Machinery, equipment and trucks shall be properly guarded, and operational hazards shall be eliminated in accordance with the provisions and intent of the latest revised edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws.
- D. See General Condition GC-30 and Section 01564 of the Specification for additional Health and Safety requirements.

GC-26. SANITARY FACILITIES

- A. CONTRACTOR shall furnish, install, and maintain ample sanitary facilities for its workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall

be conveniently placed as required by the Health and Sanitary Codes of the local, state, and federal governments.

- B. Drinking water shall also be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health and sanitary regulations.

GC-27. USE OF PREMISES

- A. CONTRACTOR shall confine its equipment, storage of materials, and construction operations to the Contract Limits, as shown on the Contract Drawings and as prescribed by ordinances or permits, or as may be directed by the GROUP, and shall not unreasonably encumber the Site or public “rights-of-way” with its materials and construction equipment.
- B. CONTRACTOR shall comply with all instructions of the GROUP, the GROUP’s REPRESENTATIVE, the REMEDIAL DESIGNER, and the ordinances, codes, etc., of the local, state, and federal governing bodies, regarding signs, advertising, traffic, fires, explosives, danger signals, barricades, etc.

GC-28. REMOVAL OF DEBRIS, CLEANING, ETC.

- A. CONTRACTOR shall, periodically or as directed by the GROUP’s REPRESENTATIVE during the progress of the work, remove and legally dispose of all surplus non-contaminated debris, and keep the Site and public “rights-of-way” reasonably clear.
- B. Upon completion of the work, prior to final inspection, CONTRACTOR shall remove all temporary construction facilities, debris, and unused materials provided for the Work, and put the whole Site and public “rights-of-way” in a neat and clean condition.
- C. The cost of all required debris removal and clean-up shall be included in the various prices bid under this Contract.

GC-29. INSPECTION/ACCEPTANCE OF THE WORK

- A. All materials and workmanship shall be subject to inspection, examination, or testing by the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER to determine the acceptability of the Work at any and all times during manufacture or construction is carried on, and CONTRACTOR shall provide proper facilities for such access and inspection.
- B. The GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER shall have the right to reject defective materials and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be

promptly segregated and removed from the Site, and replaced with materials of specified quality without additional charge/cost to the GROUP.

- C. If CONTRACTOR fails to proceed at once with the correction of rejected workmanship or defective material, the GROUP may by Contract or otherwise have the defects remedied or rejected materials removed from the Site and charge the cost of the same against any monies due or may become due to CONTRACTOR, without prejudice to any rights or remedies of the GROUP.
- D. CONTRACTOR shall furnish promptly all materials reasonably necessary for any tests that may be required. All tests by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER will be performed in such manner as not to delay the Work unnecessarily and shall be made as required by the Specifications.
- E. If the Specifications, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, laws, ordinances, or any public authority require any portion of the Work to be specifically tested and approved, CONTRACTOR shall provide the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER timely notice of its readiness for inspection. If by an authority other than the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER (such as a testing organizations designated by the GROUP), CONTRACTOR shall provide fixed dates for such inspection. If any work should be covered up without approval or consent of the REMEDIAL DESIGNER, it must, if required by the REMEDIAL DESIGNER, be uncovered for examination and properly restored at CONTRACTOR's expense.
- F. CONTRACTOR shall notify the REMEDIAL DESIGNER sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the REMEDIAL DESIGNER, CONTRACTOR shall uncover for inspection and recover such facilities all at its own expense, when so requested by the GROUP's REPRESENTATIVE or REMEDIAL DESIGNER.
- G. Should it be considered necessary or advisable by the REMEDIAL DESIGNER or the GROUP's REPRESENTATIVE at any time before final acceptance of the entire work to make an examination of Work already completed, by uncovering the same, CONTRACTOR shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to meet the requirements of the Contract, payment under the provisions of General Condition GC-10 shall be allowed, and CONTRACTOR shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.
- H. Inspection of materials and appurtenances to be incorporated in the improvements specified under this Contract may be made at the place of production, manufacture, or shipment, whenever the quantity justifies it in the opinion of the REMEDIAL DESIGNER OR GROUP's REPRESENTATIVE, and such inspection and acceptance, unless otherwise stated in the Specifications, shall be final, except as regards: 1) latent defects; 2) departures from specific requirements of the Contract; 3) damage or loss in transit; or 4) fraud or such gross mistakes as amount to fraud. Subject to the

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requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Site.

- I. Neither inspection, testing, approval, nor acceptance of the Work in whole or in part by the GROUP or its agents shall relieve CONTRACTOR or its Sureties of the full responsibility for materials furnished or work performed not in strict accordance with the Contract.

GC-30. REVIEW BY GROUP

- A. The GROUP, its authorized representatives, and agents shall at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however, that all instructions and approval with respect to the Work will be given to CONTRACTOR only by the GROUP through its authorized representatives or agents.

GC-31. FINAL INSPECTION

- A. When the Work specified under this Contract has reached Final Completion, CONTRACTOR shall notify the GROUP's REPRESENTATIVE as to a suitable date for Final Inspection. The notice will be given at least ten (10) days prior to the date stated for Final Inspection, and bear the signed concurrence of the representative of the GROUP having charge of inspection.
- B. If the GROUP determines that the status of the Work is as represented, it will make the arrangements necessary to have Final Inspection commenced on the date stated in the CONTRACTOR's notice, or as soon thereafter as practicable. The inspection party may also include the representative of the Federal Agency, other Governmental Agencies, and representatives of the Local Government.

GC-32. DEDUCTIONS FOR UNCORRECTED WORK

- A. If the GROUP deems it not expedient to require CONTRACTOR to correct Work not done in accordance with Contract Documents, an equitable deduction from the Contract Price will be made by agreement between CONTRACTOR and the GROUP, and subject to settlement, in case of dispute, as herein provided.

GC-33. INSURANCE

- A. "Personal Injury" means:
 - 1) false arrest, detention or imprisonment, or malicious prosecution; libel, slander, defamation or violation of right of privacy; wrongful entry or eviction or other invasion of right of private occupancy; and
 - 2) bodily injury, sickness or disease including death at any time resulting therefrom.

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B. Workmen's Compensation:

- 1) CONTRACTOR shall carry or require that there be carried Workmen's Compensation Insurance and Employer's Liability Insurance for all its employees and those of its Subcontractors engaged in Work on the Site, in accordance with the laws of the State of New Jersey.

C. Commercial General Liability:

- 1) CONTRACTOR shall carry or require that there be carried Commercial General Liability Insurance with limits, as specified in Supplementary Condition SC-6, for:
 - a) Personal Injury: This shall protect CONTRACTOR, its SUBCONTRACTORS, and their heirs and assigns against all claims for injury to or death of one, or more than one person, because of accidents which may occur as a result from operations under this Contract; such insurance shall cover the use of all trenching machines, excavators, trucks, cranes, hoists, rollers, concrete mixers, motor vehicles, and other equipment as may be specified elsewhere, which may be used in the execution of this Contract. This Personal Injury Liability Insurance will be carried from commencement of Work to Final Inspection and Acceptance of the Work under this Contract, and will be extended to include insurance for completed operations. The completed operations portion of the Personal Injury Liability Insurance shall be extended for the entire period of the guaranty unless otherwise specified. This insurance shall cover owned, hired, and non-owned equipment.
 - b) Property Damage: This shall protect CONTRACTOR, its SUBCONTRACTORS, and their heirs and assigns from all claims for property damage, which might arise from operations under this Contract. Property Damage Liability shall be extended to include insurance for completed operations. The completed operations portion of the Property Damage Liability Insurance shall be extended for the entire period of the guaranty unless otherwise specified.
 - c) Manufacturers' and Contractors' Liability shall not exclude liability for personal injury or damages to property as a result of blasting, explosion, collapse of buildings or structures, and damage to underground installations.

D. Automotive Liability:

- 1) CONTRACTOR shall carry or require that there be carried Automotive Liability Insurance for personal injury and property damage with the limits, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR, its SUBCONTRACTORS, and their heirs, and assigns from all claims for any personal injury or property damage caused by an occurrence and arising out of the ownership, maintenance or use, including loading and unloading, of any vehicles during the operations under this Contract. This coverage shall include coverage for owned, hired, and non-owned vehicles.

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E. Pollution Liability:

- 1) Contractor's Pollution Liability: CONTRACTOR shall carry or require that there be carried insurance, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR against losses caused by pollution conditions that arise from the operations of the CONTRACTOR or any SUBCONTRACTORS, suppliers, vendors, and agents, of all tiers, described under the scope of work of this Contract. Provide insurance coverage for:
 - a) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;
 - b) Property damage, including physical injury or destruction of tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed; and
 - c) Defense including costs, charges, and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages.

- 2) Pollution Legal Liability: CONTRACTOR shall carry or require that there be carried insurance, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR against losses that arise from the insured facility that is accepting any waste under this Contract. If the scope of services under this Contract requires the disposal of any hazardous or non-hazardous materials away from the Site, CONTRACTOR shall direct the disposal site operator to furnish a Certificate of Insurance for Pollution Legal Liability with coverage for:
 - a) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;
 - b) Property damage including physical injury, or destruction of, tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed; and
 - c) Defense including costs, charges, and expenses incurred in the investigation, adjustment, or defense of claims for such compensatory damages.

- 3) Coverage shall apply to sudden and non-sudden pollution conditions, including the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants, or pollutants into or upon land, the atmosphere or any water course or body of water, which results in bodily injury or property damage. The policy shall contain a provision that, in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery or subrogation against CONTRACTOR, the GROUP, the GROUP's REPRESENTATIVE, or the REMEDIAL DESIGNER.

F. Job Office Insurance:

- 1) CONTRACTOR, when required by Specifications, provide a job office for the use of the GROUP and the REMEDIAL DESIGNER, shall carry insurance for and in the name of the GROUP and the REMEDIAL DESIGNER, or accept full responsibility (in writing) for loss of damage to the contents to cover office

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records, supplies, instruments, equipment, and personal property of the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER using said field offices.

G. CONTRACTOR shall carry or require that there be carried any other insurance as required by Supplementary Condition SC-6.

H. Endorsements:

- 1) Commercial General Liability Insurance shall include an endorsement stating: "This policy shall cover owned, hired, and non-owned equipment." Coverage for completed operations for both personal injury and property damage extended for the period of guaranty shall be covered under this policy. Commercial General Liability coverage includes liability for personal injury or damages as a result of blasting, explosion, collapse of buildings or structures, and damage to underground installations.
- 2) Automotive Liability Insurance shall include an endorsement as follows: "This policy shall cover owned, hired, and non-owned vehicles."
- 3) All Policies shall include:
 - a) An endorsement of the Work description, Contract name, and location;
 - b) An endorsement that the Insurance Company will give at least thirty (30) days written notice to the GROUP, prior to any modification or cancellation of any such policy;
 - c) An endorsement that CONTRACTOR will be responsible for payment of all premiums and/or charges; and
 - d) An endorsement as follows: "This policy is issued in compliance with the Insurance Requirements of the Contract Documents for OU-2 Final Remedy, and the issuing Company/Agent is fully cognizant of the requirements, as stated therein."
- 4) All insurance required herein (except for Worker's Compensation and Employer's Liability) shall name the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and their officers, directors, agents, and employees as "additional insureds" under all policies.
- 5) All insurance shall be placed with carriers with a current A.M. Best's rating of no less than A, VII, unless otherwise approved by the GROUP. The required additional insured endorsements shall apply solely to work performed under this Contract. The providing of insurance, including the aforementioned additional insured endorsements, shall not be construed as CONTRACTOR's or its insurers' assumption of any liability arising out of any negligent act, omission or breach of obligation by the GROUP and/or the REMEDIAL DESIGNER.
- 6) With respect to the additional insured endorsement required under CONTRACTOR's Pollution Liability policy, the following additional terms apply:

- a) The required additional insured endorsements shall provide coverage only with respect to claims to the extent caused by CONTRACTOR in the performance of work under this Contract;
- b) Such endorsements shall be subject to all exclusions, exceptions, limitations, restrictions, and requirements set forth in such policies and available to Contractor under this Contract, at law, or in equity; and
- c) The additional insured endorsements apply only to CONTRACTOR's Commercial General Liability, Automotive Liability, and Pollution Liability portion of CONTRACTOR's policies. No coverage is provided to the additional insureds in any way with respect to the Professional Liability portion of CONTRACTOR's policies.

I. Proof of Insurance:

- 1) Before commencing any work under this Contract, CONTRACTOR shall submit copies of its Certificates of Insurance to the GROUP REPRESENTATIVE evidencing that all insurance policies and limits, as required herein, are in force. The policies shall be identified by title, policy number, effective date, expiration date, coverages, and limits of liability. Required or verbatim quotes of endorsements as required above or by the Special Conditions and any non-standard exclusion endorsements for any required policies shall be attached to or be a part of the CONTRACTOR's Certificates of Insurance.
- 2) CONTRACTOR must either include coverage for his SUBCONTRACTORS in its policies or submit similar Certificates of Insurance for each SUBCONTRACTOR before their work commences. Each SUBCONTRACTOR must be covered by insurance of the same character and in no less than the same amounts as CONTRACTOR unless CONTRACTOR and the GROUP agree that a reduced coverage is adequate because of the nature of the particular Subcontracted Work.
- 3) During the course of construction under this Contract, whenever there is a lapse in the insurance requirements as stated herein, through cancellation, expiration, failure to renew, or any other cause, the GROUP shall order the cessation of all construction activities until such time as the insurance requirements are complied with. CONTRACTOR shall have no claim or claims whatever against the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or other parties due to any delays caused thereby, nor shall such delays extend the completion time of the Contract.

J. Approval/Disapproval of Insurance:

- 1) Upon receipt of the Certificate(s) of Insurance, the GROUP will, in writing, identify the policies and indicate its approval or disapproval. New policies from other companies shall be provided in place of those disapproved. Such insurance shall only be carried with financially responsible insurance companies, licensed in the State and approved by the GROUP.
- 2) All policies shall be kept in force until CONTRACTOR's work is accepted by the GROUP (unless otherwise specified). Insurance policies (covering all operations

under this Contract or, if so noted for extended operations) which expire before CONTRACTOR's work is accepted by the GROUP (or where noted for extended operations, through the period of guaranty) shall be renewed and evidence of same submitted to the GROUP for its approval.

GC-34. PATENTS

- A. CONTRACTOR shall hold and save the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and their officers, employees, and agents harmless from liability of any nature or kind, including, but not limited to, court costs and attorney's fees, for or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the GROUP, unless otherwise specifically stipulated in the Specifications.
- B. CONTRACTOR shall pay all license fees and royalties related to or necessary for the Work and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of the GROUP, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be specified in the Contract Documents.

GC-35. WARRANTY OF TITLE

- A. No material, supplies, or equipment incorporated or to be incorporated in the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier.
- B. CONTRACTOR shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the GROUP free from any claims, liens or charges.
- C. Neither CONTRACTOR, nor any person, firm, or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon.
- D. Nothing, however, contained in this General Condition shall defeat or impair the right of person furnishing materials or labor to recover under any law permitting such persons to look to funds due to CONTRACTOR in the hands of the GROUP.
- E. The provisions of this General Condition shall be inserted in all Subcontracts and material Contracts, and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

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GC-36. GENERAL GUARANTY

- A. Neither the "*Request for Final Payment*", nor any provision in the Contract, nor partial or entire use of the improvements embraced in this Contract by the GROUP or the public shall constitute an acceptance of Work not done in accordance with the Contract or relieve CONTRACTOR of liability in respect to any express warranties or responsibility for faulty materials or workmanship.
- B. CONTRACTOR shall promptly remedy any defects in the Work without any additional compensation and pay for any damage to other Work resulting therefrom, which shall appear within a period of twelve (12) months from the date of Final Acceptance of the Work by the GROUP.
- C. The GROUP will give notice of defective materials and work with reasonable promptness.

GC-37. REQUIRED PROVISIONS DEEMED INSERTED

- A. Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

GC-38. CORRECTIONS

- A. The REMEDIAL DESIGNER will have the right to correct any discrepancies, inconsistencies, and errors in the Contract Documents, when such corrections are necessary for the proper expression of their intent.
- B. Such corrections shall take effect from the time the REMEDIAL DESIGNER gives notice thereof, and any alterations in the Work rendered necessary thereby shall be made as corrected.
- C. Any discrepancies between the approved Contract Drawings and Specifications, or any disagreement in measurements upon the Contract Drawings must be submitted to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER before construction of the Work. See General Condition GC-2 additional requirements.

GC-39. SAFETY PROVISIONS

- A. The safety provisions of applicable laws, building, and construction codes and the safety codes approved by the State Labor Commissioner shall be observed.
- B. The provisions of the Federal Occupational Safety and Health Administration's "Occupational Safety and Health Standards" and "Safety and Health Regulations for Construction" shall be observed.

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- C. Should at any time during the work under this Contract any local state, and federal safety inspector visit the Site for the purpose of a safety inspection, CONTRACTOR shall immediately notify the GROUP's REPRESENTATIVE on-Site.
- D. CONTRACTOR shall employ watchmen, as necessary, shall erect and maintain such strong and suitable barriers, and shall install lights, as necessary, to effectually prevent the happening of any health and safety incidents and/or accident. Lights shall be maintained between the hours of sunset and sunrise, and during periods of low visibility.
- E. If at any time in the opinion of the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER, the Work is not properly lighted, barricaded, and in all respects safe, both in respect to public travel or adjacent property, public or private, and if under such circumstances CONTRACTOR does not or cannot immediately put the same into proper and approved condition, or if CONTRACTOR or his representative is not upon the ground so that he can be immediately notified of the insufficiency of safety precautions, then the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER may put the Work into such a condition that shall be, in their opinion, in all respects safe, and CONTRACTOR shall pay all expenses of such labor and materials as may have been used for this purpose or by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER. Such action of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, or its failure to take such action, shall in no way relieve CONTRACTOR of the entire responsibility for any cost, loss, or damage by any party sustained on account of the insufficiency of the safety precautions taken by CONTRACTOR or by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER acting under authority of his section.

GC-40. NIGHT WORK, SUNDAYS AND HOLIDAYS

- A. CONTRACTOR shall not undertake or allow any Work to be performed on-Site without the full-time presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER.
- B. Only with the prior approval of the GROUP shall night work, work on Sundays, or Work on legal holidays, be permitted except for emergencies or as specified elsewhere.
- C. Should night work be permitted or required, the lighting and other facilities which are necessary for performing such work must be provided by CONTRACTOR and comply with the applicable safety codes.
- D. CONTRACTOR may request, in writing, permission from the GROUP's REPRESENTATIVE to undertake or allow Work to be performed on-Site without the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER full-time presence. The written request will specify the precise Work to be performed, the dates and time the Work will be performed, and the justification of the necessity to undertake or allow the Work to be performed without the presence of the GROUP's REPRESENTATIVE and/or REMEDIAL DESIGNER. The GROUP's REPRESENTATIVE may grant or deny permission at its discretion.

GC-41. OBSTRUCTIONS ENCOUNTERED

- A. In addition to showing the construction under this Contract, the drawings may show certain information obtained by the GROUP regarding conditions and features, which exist at the Site of the Work, both at and below the surface of the ground. The GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER expressly disclaim any responsibility for the accuracy or completeness of the information given on the Contract Drawings with regard to existing conditions and features, and CONTRACTOR will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information except as provided under the Sections General Conditions GC-11 and GC-41.
- B. It is specifically called to CONTRACTOR's attention that all services, laterals, etc., are not shown on the Contract Drawings, and it shall be CONTRACTOR's responsibility to locate and protect the same, as necessary.
- C. Information regarding conditions and features, which exist at the Site of the Work, both at and below the surface of the Ground, are shown in the Contract Documents only for the convenience of CONTRACTOR, who must verify this information to its own satisfaction. The giving of this information upon the Contract Drawings will not relieve CONTRACTOR of its obligations to support and protect all existing utilities, structures, and fixtures, which may be encountered during the construction of the work, except as provided in the General Conditions GC-11 and GC-41, and to make good all damages done to such existing utilities, structures, and fixtures, as provided within the Specifications.

GC-42. EXISTING UTILITIES, STRUCTURES AND FIXTURES

- A. CONTRACTOR shall, at its own expense, do everything necessary to locate, support, protect, and sustain all sewer, water, gas, or service pipes, electric light, power poles, telephone, or telegraph poles, manholes, valve boxes, conduits, and any and all utilities, structures or fixtures laid across or along the Site of the Work.
- B. The GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, as well as the company or corporation owning said utilities, structures, or fixtures, shall be notified in writing prior to approaching, uncovering, or supporting any utility, or before any utilities, structures or fixtures are removed or relocated. In case any of the said utilities, structures or fixtures are damaged by CONTRACTOR, they shall be repaired by CONTRACTOR at its own expense, or by the authorities having control of the same, and the expense of said repairs shall be deducted from the monies due or to become due to CONTRACTOR under this Contract.
- C. Should it become necessary for CONTRACTOR to remove or relocate any utilities, structures, or other fixtures, due to a grade and alignment conflicts, which would require the proposed utility, structure, or fixture (not trench excavation, sheeting, or other construction features) to occupy the same space the existing pipe, pole, conduit, and/or other fixture, such removal or relocation will be paid for in accordance with the provisions for General Condition GC-10. Should said utilities, structures or other

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fixtures be removed or relocated by the GROUP or the respective utility companies at no cost to CONTRACTOR, no payment will be made therefore.

- D. Prior to any removal or relocation of existing facilities, structures, or fixtures, CONTRACTOR shall notify the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER of the location and circumstances of such, and shall cease work (which might prove detrimental to the utility, structure, or fixture encountered), if necessary until satisfactory arrangements have been made with the owners of the same to properly care for them.
- E. Should it be necessary to cease work and a delay is caused thereby, CONTRACTOR shall have no claim for damages or any claim other than for an extension of time. See General Conditions GC-12 and GC-13.
- F. If CONTRACTOR desires temporary changes of location for its convenience for any reason whatsoever, of water lines, gas lines, sewer lines, wire lines, service connections, water, and gas meter boxes, valve boxes, light standards, cableways, signals, and any other utilities, structures or fixtures, it shall satisfy the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER that the proposed relocation does not interfere with its or other Contractor's operations, or the requirements of the Contract Drawings, and does not cause an obstruction or a hazard to traffic. CONTRACTOR shall make his own request to the utility companies, pipe owners or other parties affected for such relocation work. Such relocation work for the convenience of CONTRACTOR shall be made solely at CONTRACTOR's expense.
- G. CONTRACTOR shall not remove or relocate any utility, structure or fixture without the written approval of the owner of that utility, structure or fixture unless otherwise shown on the Contract Drawings, specifications or ordered by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER.

GC-43. CONTROL OF EXISTING FLOWS

- A. During the construction of all proposed work, CONTRACTOR shall take every precaution and do the necessary work to maintain the flow of storm drainage, sanitary sewage, and natural flows through the working areas. CONTRACTOR is solely responsible for providing all appropriate flow control systems, and there shall be no separate payment for this required work.
- B. CONTRACTOR shall be responsible for any flooding or sanitary backups on its work and to the property owners affected by such flooding or backup. CONTRACTOR shall make such provisions as may be required by the local, state, or federal health officers or any other public bodies with jurisdiction over the flows of storm drainage, sanitary seepage, and natural flows.
- C. In the event CONTRACTOR uses water from natural water sources for its operations, intake methods shall be such as to create no harmful effects; and where water is taken from a stream, reasonable flows downstream from the intake shall be maintained.

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- D. CONTRACTOR shall sequence its Work such that the infiltration of rainwater across the Site is minimized to the greatest extent reasonably practical. In particular, CONTRACTOR shall take all reasonable and appropriate provisions to limit the extents of the existing geomembrane removal, and shall be required to collect/remove all infiltrated rainwater, as necessary, to maintain internal flow gradients across the perimeter soil bentonite cut-off wall.

GC-44. SEWAGE, SURFACE, GROUNDWATER AND FLOOD FLOWS

- A. CONTRACTOR shall furnish all the necessary equipment, shall take all necessary precautions, and shall assume the entire cost of on-Site management, including collection and storage, of any sewage, seepage, storm, ground water, surface, and flood flows that may be encountered at any time during the construction of the Work. The manner of providing for these flows shall meet the approval of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, and the entire cost of said work shall be incorporated into the unit or lump sum bid prices for the various items of the Work to be done under this Contract.
- B. CONTRACTOR shall employ such feasible and practical methods in its operations to prevent pollution, sedimentation, or the introduction of impurities or other objectionable materials that may become suspended or dissolved in waters reaching streams, ponds, lakes, water supplies, or other water bodies.
- C. Water shall not be disposed of by discharging it into any street gutter, drainage channel, existing drainage system, natural stream, waterway, lake, pond, or bog, etc. without prior approval of the Authority having jurisdiction thereof and the GROUP's REPRESENTATIVE. Should such approval be obtained, CONTRACTOR shall ensure that no solids, debris, suspended soil particles, impurities, or pollutants are allowed to enter the drainage system. CONTRACTOR shall be fully responsible for any damages to these systems resulting from its disposal methods and any necessary measures (such as, but not limited to, cleanup) required to return the system to pre-construction conditions. In addition to the above, disposal on private property shall only be allowed with prior written permission of the impacted property owners.
- D. Any water used for any purpose by CONTRACTOR shall not be discharged in such a manner as to create pollution, sedimentation, or other adverse effects upon the aforementioned streams of waters.

GC-45. CONNECTING TO EXISTING WORK

- A. If appropriate to the Work, CONTRACTOR shall remove such existing masonry, concrete, equipment, and piping, as necessary and required by the Contract Documents, to make proper connections to the existing work at the locations shown.
- B. Also, CONTRACTOR shall make the necessary pipeline, roadway, and other connections at the severed points, so on completion of this Contract water, sewage, or stormwater, as the case may be, will flow through severed pipelines and structures.

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- C. Unless otherwise specified herein, no extra payment will be made for this Work, but the entire cost of the same shall be included in the unit or lump sum bid prices for the various items of the Work to be done under this Contract.

GC-46. EXISTING IMPROVEMENTS

- A. CONTRACTOR shall conduct its work as to minimize damage to existing improvements, except where specifically stated otherwise in the Contract Drawings and/or Specifications, and it will be the responsibility of CONTRACTOR to restore, as nearly as practical, to their original conditions all improvements on public or private property damaged by the Work performed by CONTRACTOR.
- B. Utility mains, ducts, poles, and services in the construction area, where shown on the Contract Drawings, are at the approximate locations furnished by various utilities concerned. These locations are subject to possible errors in the source of the information, and also, errors in transcription. CONTRACTOR shall make certain of the exact location of mains, ducts, poles, and services prior to excavation or construction near the same.
- C. The various utility companies shall be made aware of the pending construction and made generally familiar with the locations of conflicts in the case of the proposed construction. The various utility companies shall be requested to make all adjustments to their own lines except where otherwise shown on the Contract Drawings or specified. CONTRACTOR shall give ample notice to the various utilities so that existing lines can be marked in the field and adjustments made. CONTRACTOR shall cooperate fully with the various utilities and shall plan its work so that least interference is caused for all parties concerned. No additional payments shall be made to CONTRACTOR for delays caused by utility interference due to negligence on the part of CONTRACTOR. CONTRACTOR shall support all utility lines uncovered during excavation.

GC-47. SITE ACCESS

- A. CONTRACTOR shall make every effort to minimize damage to all access routes, and it shall be required to restore them to their original condition. CONTRACTOR shall acquire all necessary permits for working, on or from public streets or rights-of-way, and for securing additional access rights thereto.
- B. All costs for the removal and restoration, to original conditions, of walls, fences, structures, utility lines, poles, guy wires, or anchors, and other improvements required for passage of CONTRACTOR's equipment shall be borne by CONTRACTOR. CONTRACTOR shall notify the proper authorities of the local governing bodies and all utilities of any intended modification or disruption to their property, prior to start of construction, and shall cooperate with them in the scheduling and performance of his operation.
- C. If CONTRACTOR, by direct negotiation and bargain with any land owner, leasee, or tenant has secured any right(s) to use more space or greater privileges than the space

provided by the GROUP for purposes incidental to the performance of this Contract, CONTRACTOR shall, upon request of the GROUP's REPRESENTATIVE an/or the REMEDIAL DESIGNER, furnish proper written evidence that such additional rights have been properly secured and assurance that no damage to or claim upon the GROUP and/or local governing body will arise therefrom. The GROUP and/or local governing body shall not be liable in any way for any expenses incurred by CONTRACTOR in order to secure any such right(s) to use additional property.

- D. CONTRACTOR shall be responsible for and reimburse the GROUP for any and all losses, damages, or expenses that the GROUP may suffer, either directly or indirectly or through any claims of any person or party, for any trespass outside the spaces and rights-of-way provided by the GROUP to CONTRACTOR or any violation or disregard of the terms and conditions established for the use or occupancy of those rights or for negligence in the exercise of those rights.
- E. The GROUP may retain or deduct from any sum or sums due or to become due to CONTRACTOR such amount or amounts as may be proper to insure the GROUP and/or local governing bodies against loss or expense by reason of the failure of CONTRACTOR to observe the limits and conditions of the rights-of-way, rights-of-access, etc. provided by the GROUP.

GC-48. ACCESS TO ADJACENT PROPERTIES

- A. CONTRACTOR shall at all times maintain vehicular and pedestrian access to all properties abutting or adjacent to the Site under this Contract, all at CONTRACTOR's sole expense. In the event that normal access is cut off to a particular property due to operations or proposed work called for under this Contract, CONTRACTOR shall, at its sole expense, make other arrangements for access to said property satisfactory to the impacted property owner/tenant and the GROUP.

GC-49. USE OF ROADWAYS

- A. During the progress of the Work, CONTRACTOR shall make ample provision for both vehicular and foot traffic on any public road, and shall indemnify and save harmless the GROUP from any expense whatsoever due to its operations and/over said roadways.
- B. CONTRACTOR shall also provide free access to all fire hydrants, water and gas valves located along the line or in the vicinity of its Work. Gutters and waterways must be kept open or other provisions made for the removal of stormwater.
- C. In the event of CONTRACTOR's failure to comply with these provisions, the GROUP may cause the same to be done, and will deduct the cost of such work from any monies due or to become due CONTRACTOR under this Contract, but the performance of such work by the GROUP or at its insistence shall serve in no way to release CONTRACTOR from its general or particular liability for the safety of the public or the work.

GC-50. SNOW REMOVAL

- A. If CONTRACTOR's operations or occupancy of any public street or highway, or the rough surfaces over any trench or area being maintained by CONTRACTOR, shall interfere with the removal or plowing of snow or ice by the public authorities or land owners, or sanding of icy surfaces, in the ordinary manner with regular highway equipment, then CONTRACTOR shall perform such services for the said public authorities or owners without charge, or failing to do so, shall reimburse said authorities, owners, or the City for any additional costs to them for doing such work occasioned by the conditions arising from CONTRACTOR's operations, occupancy, or trench surfaces, together with any damage to the equipment of said parties by those conditions, or claims of any party for damage or injury or loss by reason of failure to remove snow or ice or to sand the icy spots under those conditions.

GC-51. WEATHER CONDITIONS/WORK IN FREEZING WEATHER

- A. In the event of temporary suspension of work, or during inclement weather, or whenever the GROUP's REPRESENTATIVE shall direct, CONTRACTOR and its SUBCONTRACTORS shall protect all Work areas and stored materials against damage or injury from the weather.
- B. If, in the opinion of the GROUP's REPRESENTATIVE, any Work or materials shall have been damaged or injured by reason of failure on the part of CONTRACTOR or any of its Subcontractors to protect its Work, such materials shall be removed and replaced at the expense of CONTRACTOR.
- C. Unless written permission is granted by the GROUP, Work liable to be affected by frost or freezing shall be suspended during freezing weather. When work proceeds under such a condition, CONTRACTOR shall provide approved facilities for heating the materials and for protecting the finished Work. If any materials or finished Work is allowed to become damage during freezing weather due to CONTRACTOR's fault, such materials and/or finished Work shall be repaired or replaced at the CONTRACTOR's own expense.

GC-52. INTOXICATING LIQUORS/CHEMICAL SUBSTANCES

- A. CONTRACTOR shall neither permit nor suffer the introduction or use of intoxicating liquors or mind altering chemical substances upon or about the Work specified in this Contract or upon any of the grounds occupied by CONTRACTOR and its employees.
- B. If the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER believe, in its/their opinion, any person(s) working on-Site, on behalf of CONTRACTOR or any of its SUBCONTRACTORS, is intoxicated or under the influence of mind altering chemical substances, CONTRACTOR shall be directed to forthwith remove such person(s) from the Site, and said person(s) shall not be allowed to again work on any part of the remaining Work without written consent of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.

GC-53. INDEMNIFICATION

- A. CONTRACTOR shall indemnify and hold harmless the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, other Contractors, and their consultants, agents, representatives, and employees from and against all claims, demands, suits, damages, including consequential damages and damages resulting from personal injury (as defined in General Condition GC-33-A) or damage to property, costs, expenses and fees arising out of or resulting from the performance of the Work, provided that such claims, demands, suits, damages, costs, expenses and fees are caused in whole or in part by any acts or omissions of CONTRACTOR or any of its SUBCONTRACTORS, person(s), or organization(s) for whose acts CONTRACTOR is liable.
- B. In any and all claims against the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or any of their consultants, agents, representatives, or employees by any employees of CONTRACTOR, any of its SUBCONTRACTORS, or any person(s) or organization(s) employed by any of them to perform or furnish any of the Work or anyone for whose acts any or them may be liable, this indemnification obligation, as presented in General Condition GC-53-A herein, shall not be limited in any way by limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR, any of its SUBCONTRACTORS, other person(s) or organization(s) under Workers' or Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.
- C. To the extent permitted by law, this indemnification obligation, as presented in General Condition GC-53-A herein, shall apply regardless of whether or not such claims, demands, suits, damages costs, expenses, and fees are caused in whole or in part by any person indemnified hereunder.

GC-54. DISPUTES

- A. All disputes between the parties arising out of, or in any way related to this Contract and/or the performance of the same, or its interpretation, except those disputes covered by Federal Labor Standards Provisions, shall within ten (10) days of the event or action giving rise to the dispute be presented to the GROUP's REPRESENTATIVE. All papers pertaining to the dispute shall be filed in triplicate. Such notice shall state the factors surrounding the dispute in sufficient detail to identify the dispute, together with its character and scope. In the meantime, CONTRACTOR shall proceed with the work under this Contract as directed.
- B. Any dispute not presented within the time limit specified above shall be deemed to have been waived, except that if the dispute is of a continuing character and notice of the dispute is not given within ten (10) days of its commencement, the dispute will be considered only for a period commencing ten (10) days prior to the receipt by the GROUP's REPRESENTATIVE of notice thereof. CONTRACTOR shall in no case allow any dispute to delay the work under this Contract.
- C. As soon as practicable after the final submission of all information the GROUP shall make a determination of the dispute. Said decision of the GROUP shall be a condition

precedent to any further action on the dispute. However, upon certification in writing by the claimant that the dispute has been submitted in this final form, the GROUP shall be obliged to render a decision on said dispute within sixty (60) days of the date of said certification. Should the GROUP fail to render its decision within the aforementioned sixty (60) day period, its decision will not be a condition precedent to any further action on the part of the claimant.

- D. Each decision by the GROUP will be in writing, and will be delivered to CONTRACTOR, by Federal Express/UPS or registered/certified mail, return receipt requested, at its last known address.
- E. In the event of an unfavorable decision by the GROUP, CONTRACTOR shall have the right to contest said decision as provided for under the provision of this Contract. CONTRACTOR shall notify the GROUP promptly that it intends to contest said decision, but agrees to proceed with the Work under protest.

GC-55. ARBITRATION AND LITIGATION

- A. Any controversy or claim arising out of or relating to this Contract, or the breach thereof, shall at the option of the GROUP be settled by arbitration in accordance with the Rules of the American Arbitration Association, and judgment upon the award rendered by the Arbitrator(s) may be entered in any Court having jurisdiction thereof.
- B. The GROUP will exercise its option to arbitrate concurrent with the rendering of its final decision on any claims submitted by CONTRACTOR. Should it fail to enter a final decision within the prescribed time or fail to exercise its option, said claims will be determined in accordance with the Rules of the American Arbitration Association as hereinafter stated.

GC-56. GOVERNING LAW

- A. Unless otherwise provided in the Contract Documents, this Contract and the Contract Documents shall be governed by the law of the State of New Jersey.

***** END OF SECTION *****

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SUPPLEMENTARY CONDITIONS

These Supplementary Conditions, as indicated below, amend or supplement the General Conditions and other provisions of the Contract Documents. All terms, conditions, covenants, requirements, and provisions, which are not so amended or supplemented, shall remain in full force and effect.

SC-1. NOTICE TO PROCEED/TIME FOR COMPLETION

- A. The Work for which CONTRACTOR is required to perform under this Contract shall commence at the time stipulated by the GROUP in its "Notice to Proceed" (NTP) to CONTRACTOR, and shall achieve Final Completion within two-hundred-sixty (260) consecutive calendar days following the commencement date stipulated in the NTP, or as subsequently modified in accordance with the Section 00700 of the Specifications.
- B. CONTRACTOR shall use its best efforts to complete the Work, as defined by the Contract Documents, within two-hundred-sixty (260) consecutive calendar days following the commencement date stipulated in the NTP to CONTRACTOR, but shall not be subject to liquidated damages or declared in default, if CONTRACTOR is unable to complete such work within this period, provided that such inability is not due to CONTRACTOR's default.
- C. Upon issuance of the NTP, CONTRACTOR will be bound to the performance of this Contract, and the GROUP shall issue its NTP to CONTRACTOR within fourteen (14) consecutive calendar days following execution of the Contract by the GROUP and CONTRACTOR.
- D. If CONTRACTOR is not given a NTP within fourteen (14) consecutive calendar days following execution of the Contract by the GROUP and CONTRACTOR, CONTRACTOR may elect to avoid this Contract by giving unequivocal and unconditional written notice of such avoidance to the GROUP. Such avoidance shall be effective upon actual receipt by the GROUP, prior to the mailing or actual delivery of any NTP, and CONTRACTOR's sole remedy shall be the avoidance of this Contract as set forth and the GROUP will not be liable to CONTRACTOR for any claims or losses including anticipated loss of profit and moneys expended in anticipation of performance under the Contract.
- E. Time is of the essence with regard to the time of completion and all other time limits herein, as stipulated in this Contract.

SC-2. LIQUIDATED DAMAGES

- A. Damages for any and all schedule delays (i.e., beyond the Contract specified completion date. See Supplementary Condition SC-1.) in completion of the Work, for which CONTRACTOR is required to perform under this Contract, shall be pursuant to the

penalties stipulated within the Consent Decree between the GROUP and USEPA for the OU-2 Final Remedy, dated September 30, 2004.

- B. Per the Consent Decree, CONTRACTOR and its Sureties shall be liable for and shall pay to the GROUP the following stipulated penalties for each calendar day of delay, as a result of and caused by CONTRACTOR's inability to complete the Work within the specified period, beyond the specified completion date (i.e., two-hundred-sixty [260] consecutive calendar days following the commencement date stipulated in the NTP), until such work is satisfactorily completed and accepted by the GROUP and USEPA:

| Penalty per Day | Period of delay |
|-----------------|---|
| \$500 | 1 st through 5 th day |
| \$1,000 | 6 th through 15 th day |
| \$3,000 | 16 th through 30 th day |
| \$5,000 | 31 st through 45 th day |
| \$7,500 | 46 th day and beyond |

SC-3. COMMUNICATIONS

- A. All notices, demands, inquiries, requests, instructions, approvals, proposals, and claims must be in writing.
- B. Any notice to demand upon CONTRACTOR shall be sufficiently given, if so delivered at the office of CONTRACTOR, as stated on the signature page of the Agreement (or at such other office as CONTRACTOR may from time to time designate), in a sealed, postage-prepaid envelope, prepaid Federal Express/UPS package, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.
- C. All papers required to be delivered to the GROUP shall, unless otherwise specified in writing to CONTRACTOR, be delivered to the 216 Paterson Plank Road Cooperating Group c/o Facility Coordinator, Golder Associates Inc., The National Newark Building, 744 Broad Street, 25th Floor, Suite 2500, Newark, New Jersey 07102. Any notice to or demand upon the GROUP shall be sufficiently given, if so delivered or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to Federal Express/UPS for delivery to the GROUP at such address, or delivered with charges prepaid to any telegraph company for transmission to said GROUP at such address, or to such other address as the GROUP may subsequently specify in writing to CONTRACTOR for such purpose.
- D. Any such notices shall be deemed given at the time of actual delivery/receipt, or (in case of mailing) when the same should have been received in due course of postal delivery, or in the case of telegrams, at the time of actual receipt of such telegrams, as the case may be.

SC-4. CONTRACT DOCUMENTS AND DRAWINGS

- A. The GROUP will furnish CONTRACTOR without charge five (5) complete copies of the Contract Documents, including Technical Specifications, Construction Drawings, and Addenda. If CONTRACTOR elects to request additional copies, in part or whole, of the Contract Documents, said additional copies will be furnished to CONTRACTOR at cost.

SC-5. PARTIAL USE OF IMPROVEMENTS

- A. The GROUP, at its selection, may give written notice to CONTRACTOR and place in use those portions of the Work, which have been completed, inspected, and can be accepted as complying with the Contract Documents, and if in its opinion each such portion of the Work is reasonably safe, fit and convenient for use and accommodations for that it was intended, provided:
- 1) Use of such portions of the Work shall not materially impede the completion of the remaining portions of the Work by CONTRACTOR.
 - 2) CONTRACTOR shall not be responsible for any damages or maintenance costs due directly to the use of such portions of the Work.
 - 3) Use of such portions of the Work shall in no way relieve CONTRACTOR of its liability, due to use of defective materials or poor workmanship.
 - 4) Periods of guarantee, as stipulated in General Conditions GC-133, shall not begin to run until the date of final acceptance of all work for which CONTRACTOR is required to construct under this Contract.

SC-6. INSURANCE

The following will be the limits of insurance required for this Contract:

A. Commercial General Liability:

- 1) Personal Injury Liability Insurance will have limits of \$10,000,000 (per occurrence)/\$10,000,000 (aggregate), said limits to apply also during periods when completed operations clauses are in effect.
- 2) Property Damage Liability Insurance will have limits of \$10,000,000 (per occurrence)/\$10,000,000 (aggregate), said limits to apply also during periods when completed operations clauses are in effect.

B. Automotive Liability:

- 1) Personal Injury Liability Insurance will have limits of \$5,000,000 (per person)/\$5,000,000 (per occurrence).
- 2) Property Damage Liability Insurance will have limits of \$5,000,000 (per occurrence).

C. CONTRACTOR's Pollution Liability:

- 1) Aggregate limit = \$5,000,000 (per occurrence).
- 2) Each occurrence limit = \$5,000,000.

D. Pollution Legal Liability:

- 1) Aggregate limit = \$5,000,000 (per occurrence).
- 2) Each occurrence limit = \$5,000,000.

E. Workman's Compensation Insurance:

- 1) CONTRACTOR shall carry workman's compensation insurance in accordance with State of New Jersey statutory requirements.

SC-7. LAYOUT OF WORK

- A. CONTRACTOR shall perform all layout work necessary for the satisfactory execution and completion of the Work, as shown on the Contract Drawings, and all costs in connection therewith shall be included in the contract price(s), as stipulated in Sections 00300 and 01025 of the Specifications.
- B. CONTRACTOR shall employ competent personnel, and all work shall be subject to the review, approval, acceptance, and oversight of the GROUP's REPRESENTATIVE, REMEDIAL DESIGNER, and QUALITY ASSURANCE OFFICE.
- C. CONTRACTOR shall be held responsible for protecting and safeguarding all survey control points and benchmarks established by CONTRACTOR or by others. Any replacement or re-establishment of any survey control points or benchmarks shall be at CONTRACTOR own expense, and CONTRACTOR shall not be allowed to submit any indirect or direct requests to the GROUP for reimbursement of said expenses/costs.

SC-8. "OR EQUAL" CLAUSE

- A. Unless specified otherwise in the Contract Document, the term "Or Equal" and/or "Or Equivalent" shall mean the following:
 - 1) Whenever a material, article, product, or piece of equipment is identified on the Contract Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., the intent is to establish a standard. Any material, article, product, or equipment of other manufacturer or vendor of equal or higher quality (particularly with regard to points specified in the specifications), which will perform equivalently within the design ranges specified, will be equally acceptable provided that the material, article, product, or equipment so proposed is, in the opinion of the REMEDIAL DESIGNER, of equal substance and function. Further, the manufacturer must agree to comply fully with the warranty requirements of the Specifications.

- 2) CONTRACTOR shall not assume substitute materials, articles, products, or equipment will be approved by the REMEDIAL DESIGNER, and non-approval of said materials, articles, products, or equipment will form no basis for a claim for additional compensation by CONTRACTOR without the REMEDIAL DESIGNER's written approval. If the REMEDIAL DESIGNER's approval is obtained for alternate materials, articles, products, or equipment, CONTRACTOR shall, at its own expense, make any necessary changes to the Work specified in the Contract Documents, and if additional engineering services are required or incurred by the REMEDIAL DESIGNER, due to substitution of any alternate materials, articles, products, and/or equipment, CONTRACTOR shall reimburse the GROUP for all engineering services rendered by the REMEDIAL DESIGNER in connection the substitution of said alternate materials, articles, products, and/or equipment.

SC-9. INTEREST OF MEMBERS, OFFICERS, OR EMPLOYEES OF THE GROUP, MEMBERS OF LOCAL GOVERNING BODY, OR OTHER PUBLIC OFFICIALS

- A. No member, officer, or employee of the GROUP, or its designees or agents, no member of the governing body of the locality in which the project is situated, and no other public officials of such locality or localities who exercise any functions or responsibilities with respect to the program during his/her tenure or for one (1) year thereafter, shall have any interest, direct or indirect, in any Contract or Subcontract, or the proceeds of thereof, for the Work to be performed by CONTRACTOR under this Contract.

SC-10. MAINTENANCE AND PROTECTION OF TRAFFIC

- A. During performance of this Contract, CONTRACTOR shall maintain properly regulated and controlled pedestrian and vehicular traffic flows at all times. CONTRACTOR shall make every effort to prevent delays and unnecessary inconveniences to the public throughout the life of this Contract.
- B. Should CONTRACTOR anticipate and/or encounter difficulties, obstacles, lack of cooperation from "others", etc., which might encumber the Maintenance and Protection of Traffic for which CONTRACTOR is responsible under this Contract, CONTRACTOR shall immediately contact the following parties, as appropriate and applicable:
 - 1) Fire Department;
 - 2) Police Department;
 - 3) Department of Public Works;
 - 4) Traffic Department;
 - 5) Office of the State Department of Transportation; and
 - 6) The GROUP, its REPRESENTATIVES, and the REMEDIAL DESIGNER.
- C. It shall be CONTRACTOR's responsibility to see that pedestrian and vehicular traffic flows are maintained at all times, with minimal interruptions throughout the Contract area and during the entire Contract period.

- D. CONTRACTOR shall also be required, at all times, to maintain pedestrian and vehicular access to all businesses and private establishments within the vicinity of the Site. CONTRACTOR shall also protect the pedestrian traffic against accident and/or injuries that might arise/occur within the areas of the Work, as specified in this Contract.
- E. All direct labor and expenses incidental to the Maintenance and Protection of Traffic, in connection with the Work specified in this Contract, will not be measured for payment. Hence, said direct labor and expenses shall be incorporated into the unit bid prices for the various items included in this Contract, as presented and defined in Section 00300 and 01025 of the Specifications.
- F. See Section 01550 of Specifications for additional Site Access and Traffic Control requirements.

SC-11. WORK IN THE VICINITY OF EXISTING FACILITIES

- A. CONTRACTOR shall be responsible for coordinating its prosecution of the Work with utility companies having overhead or underground services within the limits of work. CONTRACTOR shall notify the respective utility companies of services, mains, ducts, and poles, which must be relocated, capped, extended, or supported, at least fourteen (14) days before the Work is required.
- B. No payment will be made for such coordination, relocation, or support, and said costs shall be included in the unit bid item cost of the various items of Work under this Contract. See Sections 00300 and 01025 of the Specifications.

SC-12. NIGHT WORK

- A. "Night work" will only be permitted upon obtaining any necessary permits and the approval of the GROUP's REPRESENTATIVE. If night work is permitted, CONTRACTOR shall provide seventy-two (72) hour advance notice of its intent to schedule "Night work" to the GROUP's REPRESENTATIVE.

SC-13. HOURS OF OPERATION

- A. CONTRACTOR and its SUBCONTRACTORS shall not be allowed to perform any Work on-Site without the full-time, on-Site presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL ENGINEER.
- B. CONTRACTOR will limit its working hours from 7:00AM to 5:00PM on Mondays through Saturdays, unless local zoning ordinances demand otherwise. If CONTRACTOR intends to work on any given Saturday, it shall notify and provide twenty-four (24) hour advance notice to the GROUP's REPRESENTATIVE.

SC-14. EXECUTION OF AGREEMENT

- A. Within ten (10) consecutive calendar days of Notice of Award (NOA), the successful CONTRACTOR shall sign and deliver to the GROUP's REPRESENTATIVE, an Agreement in the form included in the Contract Documents, in such number of copies as the GROUP may require.
- B. If CONTRACTOR has any questions in connection to or wishes to make changes to this Agreement, CONTRACTOR shall submit, within ten (10) days following the NOA, all appropriate requests for clarification to the GROUP's REPRESENTATIVE for review and respond to said requests. In addition, CONTRACTOR may elect to request that Contract negotiation meetings be convened to expedite the Contract review and to establish mutually acceptable Contract terms and conditions.
- C. Upon establishment of mutually (i.e., between the GROUP and CONTRACTOR) acceptable Contract terms and conditions, CONTRACTOR shall sign and deliver to the GROUP's REPRESENTATIVE, an Agreement in the form included in the Contract Documents and modified accordingly in mutual agreement of both parties entering into such Agreement, in such number of copies as the GROUP may require.
- D. Upon receipt of the signed and dated Agreement, the GROUP shall countersign said Agreement, and issue its NTP to CONTRACTOR within fourteen (14) consecutive calendar days following execution of the Contract by the GROUP and CONTRACTOR.
- E. If CONTRACTOR is not given a NTP within fourteen (14) consecutive calendar days following execution of the Contract, CONTRACTOR may elect to avoid this Contract by giving unequivocal and unconditional written notice of such avoidance to the GROUP. Such avoidance shall be effective upon actual receipt by the GROUP, prior to the mailing or actual delivery of any NTP, and CONTRACTOR's sole remedy shall be the avoidance of this Contract as set forth and the GROUP will not be liable to CONTRACTOR for any claims or losses including anticipated loss of profit and moneys expended in anticipation of performance under the Contract.

SC-15. PERFORMANCE BOND, LABOR, AND MATERIAL PAYMENT BOND

- A. Having satisfied all conditions of award, as set forth elsewhere in these Documents, the successful CONTRACTOR shall, within fourteen (14) consecutive calendar days following its receipt of the GROUP's NTP, furnish a Performance Bond in a penal sum of not less than one-hundred-percent (100%) and a Labor and Material Payment bond in a penal sum of not less than one-hundred-percent (100%) of the Contract total amount, as awarded, as security for the faithful performance of the Work specified by this Contract, and for the payment of all persons, firms, or corporations to whom CONTRACTOR may become legally indebted for labor, materials, tools, equipment, or services of any nature. Such bonds shall be in the same form as that included in the Contract Documents and shall bear the same date as or a date subsequent to that of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bonds. These bonds shall be signed by a Guaranty or Surety Company listed in the latest issue of the U.S. Treasury Circular 570 and the penal sum shall be within the maximum specified for such Company in said Circular 570.

- B. Notwithstanding the foregoing, all bonds required by law shall be in accordance with the form and substance so required by law.
- C. Failure of the successful Bidder to execute such Agreement and to supply the required bonds within fourteen (14) consecutive calendar days of the GROUP NTP, or within such extended period as the GROUP may grant, based upon reasons determined sufficient by the GROUP, shall constitute a default.

SC-16. PRE-AWARD MEETING

- A. At the option of the GROUP, and without additional expense to the GROUP, a pre-award conference may be scheduled, provided one (1) week's advance notice of the time and place of the same shall be given to CONTRACTOR.

SC-17. PROTECTION OF EXISTING SLURRY AND SHEET PILE WALL SYSTEMS

- A. Given the critical nature and general instability of the existing steel sheet pile wall system along Peach Island Creek, CONTRACTOR shall take all appropriate precautions, as it deems necessary, to protect the existing steel sheet pile wall system and prevent any induced lateral and/or rotational movements of this wall, under any applied construction material and equipment loads.
- B. CONTRACTOR shall not be allowed to position any construction material or equipment loads within a forty (40) feet horizontal offset area behind the existing steel sheet pile wall, as measured from the top of the wall, unless specifically directed or approved otherwise by the REMEDIAL DESIGNER.
- C. CONTRACTOR shall be responsible for maintaining the integrity of the existing perimeter slurry wall system, and shall take all appropriate precautions, it deems necessary, to protect said slurry wall system. If the integrity of the existing perimeter slurry wall system is compromised, due to CONTRACTOR's actions or any Work performed under this Contract Agreement, CONTRACTOR shall repair and/or replace, at its own cost, said impacted slurry wall sections in kind and to acceptance of the REMEDIAL DESIGNER.

***** END OF SECTION *****

SECTION 01015

DEFINITIONS

PART 1 – GENERAL

1.01 PARTICIPANTS

- A. USEPA: The word “USEPA” means the US Environmental Protection Agency, Region II, 290 Broadway, New York, NY 10007-1866.
- B. NJDEP: The word “NJDEP” means the New Jersey Department of Environmental Protection, 401 East State Street, 5th Floor, CN 028 Trenton, NJ 08625.
- C. GROUP: The word “GROUP” means the 216 Paterson Plank Road Cooperating PRP Group.
- D. GROUP’s REPRESENTATIVE: The words “GROUP’s REPRESENTATIVE” or “GROUP’s REPRESENTATIVES” mean a representative or representatives of the 216 Paterson Plank Road Cooperating PRP Group, as identified in the Contract Agreement.
- E. CONTRACTOR: The word “CONTRACTOR” means the individual, partnership, firm, corporation or any combination thereof, including SUBCONTRACTORS, contracting with the GROUP for work covered by these Specifications.
- F. REMEDIAL DESIGNER: The words “REMEDIAL DESIGNER” mean Golder Associates Inc., 200 Century Parkway, Suite C, Mt. laurel, New Jersey, 08054 and/or 744 Broad Street, 25th floor, Suite 2500, Newark, New Jersey, 07102.
- G. QUALITY ASSURANCE OFFICIAL OR OFFICER (QAO): The words “QUALITY ASSURANCE OFFICER” or “QUALITY ASSURANCE OFFICE” are to be determined.
- H. SUBCONTRACTOR: The word “SUBCONTRACTOR” means the individual, partnership, firm, corporation or any combination thereof, contracting with the CONTRACTOR for work covered by these Specifications.
- I. MANUFACTURER: The word “MANUFACTURER” means the individual, partnership, firm, corporation or any combination thereof, which produces or supplies materials used to complete the Work.

1.02 CONTRACT DEFINITIONS

- A. Addenda: Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Documents or the Contract Documents.

- B. Application for Payment: The form accepted by the GROUP's REPRESENTATIVE which is to be used by the CONTRACTOR in requesting progress or final payments, and which is to include such supporting documentation as required by the Contract Documents.
- C. Bidding Documents: Include, but may not be limited to, the Invitation/Instructions to Bidders, Information Available to Bidders, Bid Submittal Letter, Bid Forms, Construction Agreement, Specifications, Contract Drawings, and the "Contract Documents" (including all Addenda issued prior to receipt of Bids).
- D. Bid: A document submitted by an interested party in response to the GROUP's request for proposal which includes the proposed methods, schedule, and costs for the interested party to perform the Work.
- E. Bonds: Bid, performance and payment bonds, and other instruments of security.
- F. Change Order: A document required by the GROUP's REPRESENTATIVE, which is signed by the CONTRACTOR and the GROUP authorizing an addition, deletion or revision in the Work, and/or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.
- G. Competent Person: The words "Competent Person" mean an individual provided by the CONTRACTOR, and approved by GROUP or GROUP's REPRESENTATIVE, who is qualified and experienced to implement, supervise, and inspect the Work.
- H. Construction Drawings/Contract Drawings: The drawings issued for construction which show the character and scope of the Work to be performed, which have been prepared or approved by the REMEDIAL DESIGNER, and which are included in the Contract Documents. See Section 00210 of Specifications for a List of Contract Drawings.
- I. Contract Documents: The Contract Documents include Specifications, all Addenda, the Agreement, General and Supplemental Conditions, Bid, and Contract Drawings.
- J. Contract Price: The amount payable by the GROUP to the CONTRACTOR under the Contract Documents. Minor changes to the Contract Price (\$10,000 or less) may be approved by the GROUP's REPRESENTATIVE.
- K. Contract Time: The number of days or the time period stated in the Form of Agreement for completion of the Work. The GROUP's REPRESENTATIVE may approve minor changes to the Contract Time (14 days or less), as long as the total number of days beyond the contract does not exceed thirty (30) days. Major schedule changes; i.e. greater than fourteen (14) days for a single task and greater than thirty (30) days for all tasks, must be approved by the GROUP.
- L. Defective Work: Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the GROUP's REPRESENTATIVE's

recommendation of final payment (unless responsibility for the protection thereof has been assumed by GROUP at Substantial Completion).

- M. Deficiency: An element of completed work which has been identified as Defective.
- N. Field Order: A written order issued by the REMEDIAL DESIGNER that orders minor changes in the Work but does not involve changes in the Contract Price nor the Contract Time, and does not require approval by the GROUP's REPRESENTATIVE.
- O. Final Completion: The GROUP will make a final inspection with CONTRACTOR and GROUP's REPRESENTATIVE, and will sign the Certificate of Final Completion, if Work is complete, or will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.
- P. Form of Agreement: A legal contract between the CONTRACTOR and the GROUP which includes, but is not limited to the Contract Price and Contact Time for the Work.
- Q. General Specifications: Sections contained in Division 1 of the Specifications.
- R. Install: Provide and install, unless otherwise noted.
- S. Installer: The word "Installer" means the individual, partnership, firm, corporation, or any combination thereof, contracting with the CONTRACTOR for work covered by these Specifications.
- T. Laws and Regulations/Laws or Regulations: Laws, rules, regulations, ordinances, codes, and/or orders of any governmental entity having jurisdiction over the Work. The State of New Jersey shall be the jurisdiction for any and all disputes.
- U. Notice of Award: The written notice by the GROUP to the apparent successful Bidder stating that, upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein and, within the time specified, the GROUP will sign and deliver the Agreement.
- V. Notice to Proceed: A written notice given by the GROUP's REPRESENTATIVE to the CONTRACTOR fixing the date on which the Contract Time will commence to run, and on which the CONTRACTOR shall start to perform the CONTRACTOR's obligations under the Contract Documents.
- W. Products: The term "material" or "products" shall include products, equipment, assembly methods, manufacturer, brand, trade name, or other description. References to "equivalent," "approved equivalent," or similar terms mean that approval from the REMEDIAL DESIGNER is required. All materials shall be new and specifically purchased for the Work under this Contract, unless as otherwise accepted by the GROUP's REPRESENTATIVE or specified in the

- Contract Documents. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- X. Provide or Provided: Means “furnish and install” to the satisfaction of the GROUP’s REPRESENTATIVE.
- Y. Quality Assurance (QA): Means measures taken by the GROUP’s REPRESENTATIVE through the QAO to independently assess if the contractor is in compliance with the Contract Documents for the project.
- Z. Quality Control (QC): Means measures taken by the CONTRACTOR to determine compliance with the requirements for materials and workmanship as stated in the Contract Documents.
- AA. Record Documents: A complete set of Contract Documents marked such that any field changes are readily identified. These Record Documents shall be maintained by the CONTRACTOR on-Site, and upon Contract completion, shall be sealed and provided to the GROUP.
- BB. Referenced Standard: A recognized standard, which is identified in a Specification and incorporated by reference.
- CC. Schedule of Values: The CONTRACTOR’s itemized listing of activities of the Work, set forth, in a form acceptable to the GROUP’s REPRESENTATIVE, which describes the CONTRACTOR’s allocation of the Contract Price by activity. These same activities shall be identical to those listed in the CONTRACTOR’s progress schedule.
- DD. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of the Work; and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a Supplier, and submitted by the CONTRACTOR to illustrate material or equipment for some portion of the Work, and that must be maintained on-site.
- EE. Substantial Completion: The Work (or a specified part thereof) has progressed to the point where, in the opinion of the GROUP’s REPRESENTATIVE as evidenced by the GROUP’s definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that final payment is due. The terms “substantially complete” and “substantially completed” as applied to any Work refer to Substantial Completion thereof.
- FF. Successful Bidder: The Bidder to whom the GROUP makes an award.
- GG. Supplier: A manufacturer, fabricator, distributor, material man, or vendor.
- HH. Technical Specifications/Specifications: Those portions of the Bidding Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.
- II. Transportation and Handling: All material shall be shipped, delivered, and stored in the manufacturer’s undamaged crating and packaging, except as otherwise

approved by the REMEDIAL DESIGNER. All materials shall be protected and stored off the ground on blocking, or pallets, and shall be covered as appropriate. All material shall be protected from damage due to weather, vandalism, etc.

JJ. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, as required by the Contract Documents.

KK. Workday: Any calendar day that CONTRACTOR performs actual, productive Work at the Site between the designated "Hours of Operation" (i.e., Mondays through Saturdays between the hours of 7:00AM and 5:00PM), as stipulated in Supplementary Condition SC-13 (see Section 00800 of the Specification).

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

***** END OF SECTION *****

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 GENERAL

- A. Furnish all labor, materials, tools, equipment, and appurtenances required to measure the quantity of the Work completed by CONTRACTOR, as specified in the Contract Documents.
- B. This Section establishes the payment criteria applicable to those designated portions of the Work performed under stipulated “unit price” and “lump sum” payment methods.
- C. This section also establishes defect assessment and non-payment criteria for any and all rejected Work, in the opinion of the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER, due to CONTRACTOR’s non-compliance with the Contract Documents.
- D. Applications for Payment shall be in accordance with the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 00300 – Bid Forms
- B. Section 00700 – General Conditions
- C. Section 00800 – Supplementary Conditions
- D. Section 01050 – Field Engineering and Surveying
- E. Section 01300 – Submittals
- F. Section 01700 – Contract Closeout
- G. Section 01720 – Record Documents

1.03 AUTHORITY

- A. Measurement methods delineated in this Section are intended to compliment the criteria presented within the individual Sections of the Specifications. In the event of conflict, the requirements of the individual Specification Sections shall govern.
- B. CONTRACTOR shall be solely responsible for taking all measurements, where and as required, computing all payment quantities, and providing all supporting documentation, as required or warranted, for each Bid Item included in/with each Application for Payment. The GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER will verify all items, measurements, and quantities.

Revision 2

- C. CONTRACTOR shall assist in verifying quantities by providing any and all necessary equipment, workers, and survey personnel, as required and requested by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER.

1.04 UNIT QUANTITIES SPECIFIED

- A. Quantities and measurements indicated in the Bid Forms (i.e., Exhibits "A" and "B" to Section 00300 of these Specifications) are for bidding and Contract purposes only. Actual in-place quantities and measurements supplied by CONTRACTOR and verified by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall determine actual payment quantities and amounts.
- B. If CONTRACTOR believes the Work will require more or fewer quantities than those quantities indicated in the Bid Forms, it shall provide its estimated quantities to complete the Work at the unit prices listed in the Bid Forms or as defined under subsequent modifications to the Contract Documents.

1.05 MEASUREMENT OF QUANTITIES

- A. Measurement Devices:
 - 1. Weigh Scales: Inspected, tested, and certified by the State of New Jersey Weights and Measures Department within the past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicles.
 - 3. Metering Devices: Inspected, tested, and certified by the State of New Jersey within the past year.
- B. Measurement by Weight: Measurements of quantities expressed in weight units shall be based upon actual measured weights, utilizing measurement devices deemed acceptable and approved by the GROUP's REPRESENTATIVE.
 - 1. Concrete reinforcing steel, rolled, or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weights.
- C. Measurement by Volume: Measurement of quantities expressed in volume units shall be based upon in-place, neat plan line projections of the Work limits, as determined by field survey record drawings, for each item with no additional allowances for shrinkage, swelling, or creep.
 - 1. In computing volumes of excavation and fill, "average end-area" or equivalent methods, deemed acceptable and approved by the GROUP's REPRESENTATIVE, shall be used.

Revision 2

- D. Measurement by Area: Measurement of quantities expressed in area units shall be based upon horizontal, planimetric projections of the Work limits, as determined by field survey record drawings, for each item with no additional allowances for slopes.
- E. Measurement by Horizontal Linear Units: Measurement of quantities expressed in horizontal linear units, such as piping and conduits, shall be based upon field surveyed stations recorded along straight or curved centerline projections for each respective item.
- F. Measurement by Vertical Linear Units: Measurement of quantities expressed in vertical linear units, such as wells, piezometers, etc., shall be based upon field surveyed soundings of the bottoms of each installed borehole, well, or piezometer measured relative to ground surface for each respective item.
- G. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear units/means or any combination thereof, as appropriate, as a completed item or unit of the Work.

1.06 PAYMENT

- A. Payment for each “lump sum” and “unit price” Bid Items, as stated in the itemized Bid Forms (i.e., Exhibits “A” and “B” to Section 00300 of the Specifications), shall constitute complete, full compensation for all required labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application, or installation of an item of the Work required to complete all work specified under that particular item, including cleanup.
 - 1. The price bid for each “lump sum” and “unit price” stated in the itemized Bid Forms shall be deemed to include allowances for CONTRACTOR’s overhead and profit.
 - 2. Reference to relevant Sections of the Specifications is provided to facilitate pricing. However, CONTRACTOR shall, using its own judgment, determine those Sections of the Specifications that are relevant to each pay item, prior to submitting its comprehensive price to cover all Work identified and specified in the Contract Documents.
 - 3. Each “lump sum” and “unit price” stated in the itemized Bid Forms shall include, except where explicitly stated otherwise, all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent, including, but not limited to, cleaning up, Site security, emissions control, odor control, duct control, decontamination, health and safety, quality control, and traffic control.
 - 4. Payment of all Bid Items, as stated in the itemized Bid Forms, will be made in accordance with the Contract Agreement, and only after verification by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER.

5. Retainage shall be held on all payments, in accordance with the requirements stipulated in the Contract Agreement.
- B. For “in-progress” payments, placement documentation shall include, but not limited to, daily field reports prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE, delivery invoices, scale house measurements, field measurements utilizing measuring tapes or wheels, etc. Equipment and methods of material-placement documentation for “in-progress” payments shall be deemed acceptable to the GROUP’s REPRESENTATIVE.
- C. Payment for Work shall be made on the basis of actual measurements and quantities, reviewed, verified, and accepted by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER, multiplied by the unit prices for the Work, as state in the Bid Forms, that is incorporated into, or made necessary by, the Work. For payment, record documentation shall include, but not be limited to, actual field surveys by Professional Land Surveyors licensed and registered in the State of New Jersey.
- D. Payment will be made to the Contract limits, as specified in the Contract Documents. If the constructed limits are less than the specified limits, payment will be made to the actual limits of construction, as shown on the Record Drawings. Payment for quantities that exceed the specified Contract limits will only be made with the approval of the GROUP’s REPRESENTATIVE. Payment for quantities that exceed the Contract quantities, as stipulated in the Bid Forms, shall only be obtained through approved Change Order(s), which must be issued before the Contract quantities are exceeded.
- E. No partial payments shall be made for the installation of items, which have not been tested and approved.
- F. No piping or conduits shall be backfilled prior to completion of all necessary field surveys to document final “as-built” conditions. If CONTRACTOR backfills any excavations before completion of all necessary field surveys, CONTRACTOR will be required to re-excavate said areas to facilitate and complete the necessary field surveys, and CONTRACTOR shall not be compensated for said re-excavation costs by the GROUP.
- G. Partial payment will be made for materials delivered to the Site (exclusive of fill materials), and adequately stored and protected until installation. Partial payments for delivered materials will only be made for items that CONTRACTOR intends to use within ninety (90) days of delivery, unless otherwise approved by the GROUP’s REPRESENTATIVE. Materials will be paid for at direct cost plus shipping, upon presentation of a valid receipt, bill, or invoice with the payment request. All such requests must have material quantities verified by the GROUP’s REPRESENTATIVE, prior to payment. CONTRACTOR shall protect all delivered materials, as outlined by the manufacturer while being stored at Site, and shall replace all damaged materials at no cost to the GROUP. No partial payment will be made for materials

delivered to the Site for which the receipt, bill, or invoice is less than five-hundred-dollars (\$500).

- H. Upon installation, the “unit cost” for the item will be paid less any prior partial payments for stored material. Upon installation, an adjustment will be made in payment to account for the quantity of materials actually installed in the Work. The GROUP will not pay for any materials in excess of what is actually installed in the Work.
- I. Payment for “unit price” items (all items except “lump sum” items) will be made monthly until completion of each “unit price” item, based on quantities estimated by CONTRACTOR, and verified by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER. Final payment will be based on actual quantities established/calculated by CONTRACTOR from the Record Drawings, less any partial payments paid by the GROUP for each Bid Item.

1.07 VARIATIONS IN QUANTITIES AND PRICES

- A. Quantities stipulated in the Bid Forms represent only approximate values, and are provided as a basis for the uniform comparison of submitted Bid Proposals, and the GROUP and the GROUP’s REPRESENTATIVE does not expressly or by implication agree that actual amounts of Work will correspond therewith.
- B. CONTRACTOR must provide, for “unit price” Work, a proposed Contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed, and are solely for the purpose of comparing Bids. Each such “unit price” will be deemed to include an amount for overhead, profit, and any indirect costs for each separately defined Bid Item.
- C. An increase or decrease in the quantity for any “unit price” item, as stipulated in the Bid Forms” shall not be regarded as sufficient grounds for an increase or decrease in the “unit price” of the items except as provided herein.
- D. With the exception of Bid Items No. 9 and 29, if the quantity of a “unit price” Bid Item, as stipulated in the Bid Forms, in this Contract is an estimated quantity and the actual quantity of this “unit price” Bid Item varies by more than twenty-five (25) percent above or below the estimated quantity, or above or below twenty-five (25) percent of the sum of quantities for “unit price” work where two sub-items are listed, and the total variance in price of the “unit price” Bid Item would result in a variance equal to or more than ten (10) percent of the Contract base price, an equitable adjustment to the Contract price may be made upon demand of either party, provided “Part 3 – BASE CONTRACT PAYMENT ITEMS” of this Specification Section does not include any specific Contract language to the contrary for each individual Bid Item. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variations below seventy (75) percent of the estimated quantity or above one-hundred-twenty-five (125) percent of the estimated quantity, or sum of quantities for “unit price” Work where two sub-items are listed.

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- E. If any Bid Item quantity variations are such as to cause an increase in the time, relative to the duration of Work stated in Contractor's Baseline Construction Progress Schedule, necessary for completion, CONTRACTOR may request, in writing, an extension of time, to be received by the GROUP's REPRESENTATIVE within ten (10) working days of any realized Bid Item quantity variations, or within such further period as may be granted by the GROUP's REPRESENTATIVE before the date of final settlement of the Contract. Upon the receipt of a written request for a time extension from CONTRACTOR, the GROUP's REPRESENTATIVE shall ascertain the facts and make all appropriate adjustments for extending the Contract completion date, provided the GROUP's REPRESENTATIVE deems said request for a time extension is justified.

1.08 DEFECT ASSESSMENT

- A. Replace all Work, or portions thereof, not conforming to or in compliance with the Contract Documents at CONTRACTOR's sole expense.
- B. If, in the opinion of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, it is not practical to remove and replace the Work, the GROUP's REPRESENTATIVE will direct one of the following remedies:
 - 1. Remove and replace the defective Work, at CONTRACTOR's sole expense;
 - 2. The defective Work may remain, but an equitable adjustment will be made by the GROUP's REPRESENTATIVE to the "lump sum" or "unit price" for the associated Bid Item; or
 - 3. The defective Work will be partially repaired to the satisfaction of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, and an adjustment will be made by the GROUP's REPRESENTATIVE to the "lump sum" or "unit price" for the associated Bid Item to reflect the defective Work.
- C. The individual Specification Sections may modify these options or may identify specific formula or percentages of "lump sum" and/or "unit price" reductions for such defective Work.
- D. The authority of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER to assess defective Work and identify payment adjustment, if applicable, is final.

1.09 NON-PAYMENT FOR REJECTED PRODUCTS

- A. Payment will not be made for any Bid Items not in compliance with the Contract Documents including, but not necessarily limited to, the following:

1. Products wasted or disposed of in a manner that is not acceptable;
2. Products determined as unacceptable before or after placement;
3. Products not completely unloaded from the transporting vehicle;
4. Products placed beyond the lines and levels of the required Work;
5. Products remaining on hand after completion of the Work;
6. Loading, hauling and disposing of rejected Products; and
7. Materials that may be lost or stolen from the project Site.

PART 2 – PRODUCTS

Not used.

PART 3 – BASE CONTRACT PAYMENT ITEMS

3.01 BID ITEM NO. 1: MOBILIZATION/DEMobilIZATION (LUMP SUM)

A. Measurement:

1. The Work required for this bid item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all engineering, submittal, and work plan development leading up to initiation of field construction activities; mobilization and demobilization of all labor, owned and rented equipment, and materials to and from the Site; CONTRACTOR-provided utilities and temporary facilities; insurance; on-going related expenses considered normal for administration of the Work; and all other requirements of the Work not covered in other Bid Items. Initial development of items required for job execution shall be considered part of this Bid Item including, but not limited to, preparation of the Baseline Construction Progress Schedules, initial construction photographs and video, additional subsurface investigations, temporary modifications to existing fences, establishment of staging and parking areas, procurement of temporary service contracts (i.e., electric, telephone, water, sewer), and location of existing Site features (e.g., utilities) in accordance with the requirements of the Contract Documents.
2. Payment, less applicable retainage, for this item shall also include full compensation for the preparation of initial written plans and submittals, cost items generally associated with Division 1 of the Specifications, excluding the Health and Safety Plan (HASP), which is compensated under Bid Item No. 5 and the Soil Erosion and Sedimentation Control Plan, which is compensated under Bid Item No. 6, permit applications not explicitly covered under other Bid Items, and incidentals to the Work not directly associated with the other Bid Items.

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3. Twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's first/initial payment request following mobilization of sufficient labor, equipment, and materials to progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price, until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's final payment request, submitted in accordance with the Contract.
4. The total price paid for this Bid Item shall not exceed six (6) percent of the original total Contract amount/value.

3.02 BID ITEM NO. 2: SURVEYING AND FIELD ENGINEERING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and materials associated with staking, construction surveying, surveys for measurement and payment, and preparation and maintenance of the require record "as-built" drawings and supporting documentation, in accordance with the requirements of the Contract Documents.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.03 BID ITEM NO. 3: PERFORMANCE BOND (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for supplying a performance bond in accordance with the Contract Documents.
2. Payment of this lump sum Bid Item shall be in full, less applicable retainage, with CONTRACTOR's initial payment request.

3.04 BID ITEM NO. 4: PAYMENT BOND (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for supplying a payment bond in accordance with the Contract Documents.
2. Payment of this lump sum Bid Item shall be in full, less applicable retainage, with CONTRACTOR's initial payment request.

3.05 BID ITEM NO. 5: HEALTH AND SAFETY & AIR MONITORING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and materials necessary to provide all appropriate and qualified health and safety and air monitoring personnel, equipment, and supplies to prepare and implement CONTRACTOR's Site-specific Health and Safety Plan (HASP), which shall be submitted to and not disapproved by the REMEDIAL DESIGNER and GROUP's REPRESENTATIVE, in accordance with the requirements of the Contract Documents.
2. Twenty-five (25) percent of the lump sum price bid will be paid, less applicable retainage, with CONTRACTOR's first/initial payment request, provided it has submitted and received approval of its Site-specific HASP and satisfactory evidence of mobilization of sufficient labor, equipment, and material to adequately progress the Work of this Contract. Five (5) percent of the lump sum price bid, less applicable retainage, will be paid with each of CONTRACTOR's 2nd through 11th

payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's final payment request, as submitted in accordance with the Contract.

3. No material payments will be granted for this Bid Item.

3.06 BID ITEM NO. 6: SOIL EROSION AND SEDIMENT CONTROL (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to furnish, install, maintain, and remove, as required by the Contract Documents and/or directed by the GROUP's REPRESENTATIVE and/or REMEDIAL DESIGNER, temporary and permanent erosion and sedimentation control measures including, but not limited to, erosion control matting, silt fencing, diversion berms/channels, seeding, and sedimentation traps, as required by CONTRACTOR's Site Erosion and Sedimentation Control Plan and as deemed necessary by the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and/or the QUALITY ASSURANCE OFFICER (QAO) to control erosion and sedimentation during construction activities, in accordance with the requirements of the Contract Documents.
2. The lump sum price for this Bid Item shall also include all costs incurred by CONTRACTOR to prepare its Site-specific Soil Erosion and Sedimentation Control Plan, which shall outline and describe CONTRACTOR's construction sequencing and corresponding soil erosion and sedimentation control measures to be implemented by the CONTRACTOR during its construction efforts, in accordance with the requirements of the Contract Documents.
3. Twenty-five (25) percent of the lump sum price bid will be paid, less applicable retainage, with CONTRACTOR's first/initial payment request, provided it has submitted and received approval of its Soil Erosion and Sedimentation Control Plan and satisfactory evidence of mobilization of sufficient labor, equipment, and material to adequately progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid, less applicable retainage, with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be

paid with CONTRACTOR's final payment request, as submitted in accordance with the Contract.

4. No material payments will be granted for this Bid Item.

3.07 BID ITEM NO. 7: CLEARING AND GRUBBING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all clearing, grubbing, handling, chipping, loading, hauling, and disposing or composting of all existing vegetative materials and surface debris to prepare areas to receive the proposed new soil cover system, perimeter drainage channels, access roads within the limits of disturbance, as shown on the Contract Drawings. Off-site disposal of cleared and grubbed materials shall be at a facility approved by the GROUP's REPRESENTATIVE.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.08 BID ITEM NO. 8: REMOVE EXISTING GEOMEMBRANE AND SUBGRADE PREPARATION (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor and equipment to: a) sequentially and systematically remove and dispose off-Site the existing 60-mil geomembrane, and its underlying non-woven geotextile cushioning layer; b) drain, remove, and dispose off-Site the existing geomembrane weighting system; c) perform all subgrade preparation activities, excluding the import, placement, and compaction of grading fill, which shall be compensated under Bid Item No. 9; and d) prepare areas to receive the proposed new soil cover

system, perimeter drainage channels, access roads within the limits of disturbance, as indicated in the Contract Documents.

2. Off-site disposal of the existing geomembrane materials shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the lump sum price bid for this Bid Item shall include all necessary testing and characterization costs for the existing geomembrane and its underlying cushioning materials, as required by the designated disposal facility.
3. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.09 BID ITEM NO. 9: PLACE GRADING FILL (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, compacted Cubic Yards at actual locations of placement.
2. Measurement will be made by comparing before (i.e., prior to placement of grading fill, but following completion of subgrade preparation Work) and after (i.e., following placement of grading fill and surface re-grading Work) field record surveys of proposed new soil cover system subgrade elevations, as defined by the Contract Drawings and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to excavate, load, haul (from anywhere on-Site), unload, sort, prepare (crushing, shredding, mixing with soil), place, grade, and compact existing fill materials, which underlie the existing geomembrane, in accordance with the Contract Documents. Should additional grading fill be required to attain the specified new cover system subgrade elevations, as defined by the Contract Drawings or as directed by the GROUP's REPRESENTATIVE, additional grading fill shall be obtained from approved off-Site borrow sources, and payment for the delivery, placement, and compaction of this additional grading fill shall be made under this Bid Item.

2. Per CONTRACTOR's October 29, 2007 correspondence to the REMEDIAL DESIGNER that provided response to Requests for Bid Clarifications, CONTRACTOR agrees to provide additional imported grading fill, in accordance with the Contract Documents, in excess of the estimated quantity presented in the Bid Forms (i.e., 2,000 Cubic Yards) at a fixed unit rate of twenty-one-dollars-per-ton (\$21 per Ton), which is all inclusive and includes all chemical and geotechnical Quality Control testing, placement, grading, handling, and compaction costs. In addition, for purposes of this Contract Agreement, the GROUP assumed the equivalent unit price for additional grading fill in excess of two-thousand (2,000) Cubic Yards shall equal twenty-nine-dollars-and-forty-cents-per-cubic-yard (\$29.40 per Cubic Yard), assuming the imported grading fill has a unit weight of one-point-four (1.4) Tons-per-Cubic Yard.
3. Regardless of the actual quantity of grading fill imported to the Site, CONTRACTOR shall not be granted any modifications to the unit price for this Bid Item, unless specifically identified and/or allowed herein.
4. Progress payments, less applicable retainage, shall be made based on estimated in-place, compacted volumes, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
5. Final payment, less applicable retainage, shall be based on the final, actual in-place, compacted volumes of grading fill, as determined by comparing before (i.e., prior to placement of grading fill, but following completion of subgrade preparation Work) and after (i.e., following placement of grading fill and surface re-grading Work) field record surveys in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments. Final payment shall only be based on actual fill quantities, and not on cut quantities, as determined from pre- and post-placement surveys, irrespective of whether these quantities balance.
6. No material payments will be granted for this Bid Item.

3.10 BID ITEM NO. 10: INSTALL GEOSYNTHETIC CLAY LINER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified geosynthetic clay liner, as required by the Contract Documents and in accordance with the manufacturer's material and installation specifications.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. This Bid Item does not include payment for any subgrade preparation and placement of grading fill Work to achieve the specified new cover system subgrade elevations, as defined by the Contract Drawings, which are covered in Bid Items No. 8 and/or 9.
5. Material payments for the geosynthetic clay liner delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
6. Progress payments, less applicable retainage, for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of geosynthetic clay liner materials.
7. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.11 BID ITEM NO. 11: INSTALL NEW GEOMEMBRANE (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified new geomembrane, as required by the Contract Documents and in accordance with the manufacturer's material and installation specifications.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. Material payments for the new geomembrane delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
5. Progress payments, less applicable retainage, for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of new geomembrane materials.
6. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.12 BID ITEM NO. 12: INSTALL GEOCOMPOSITE DRAINAGE LAYER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified geocomposite drainage layer, as required by the Contract Documents and in accordance with the manufacturer's material and installation specifications.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. Material payments for the geocomposite drainage layer delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
5. Progress payments, less applicable retainage, for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of geocomposite drainage layer materials.
6. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on

actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.13 BID ITEM NO. 13: PLACE COVER SOIL (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, grade, and compact the required 18-inch-thick (minimum) cover soil layer, as specified by the Contract Documents.
2. Actual planimetric areas will be measured for payment.
3. Progress payments, less applicable retainage, shall be made based on estimated in-place, compacted planimetric areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment, less applicable retainage, shall be based on the final in-place, compacted planimetric areas of the cover soil layer, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.
5. No material payments will be granted for this Bid Item.

3.14 BID ITEM NO. 14: PLACE VEGETATIVE SUPPORT LAYER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, and grade the required 6-inch-thick (minimum) vegetative support layer, as specified by the Contract Documents.
2. Actual planimetric areas will be measured for payment.
3. Progress payments, less applicable retainage, shall be made based on estimated in-place, compacted planimetric areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment, less applicable retainage, shall be based on the final in-place, compacted planimetric areas of the cover soil layer, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.
5. No material payments will be granted for this Bid Item.

3.15 BID ITEM NO. 15: IN-SITU "HOT SPOT" TREATMENT FIELD VERIFICATION PROGRAM (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-situ "Hot Spot" Treatment Field Verification Program.
2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment Field Verification Program production activities.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all labor, equipment, and materials, excluding all labor, materials, and equipment costs in connection with the required volatile organic chemical (VOC) off-gas collection, treatment, and discharge system that will be compensated under Bid Items No. 29 and 29-A, to undertake and complete the required In-Situ "Hot Spot" Treatment Field Verification Program, as specified in Section 02450 of the Technical Specifications. Furthermore, all labor, equipment, and materials used in this field verification program shall be identical to CONTRACTOR's anticipated, planned In-Situ "Hot Spot" Treatment Production Operation methods, which will be employed and compensated under Bid Item No. 16.

2. CONTRACTOR shall undertake and complete the specified In-Situ “Hot Spot” Treatment Field Verification Program to the satisfaction of the GROUP, the GROUP’s REPRESENTATIVE, and the REMEDIAL DESIGNER. In addition, CONTRACTOR shall use all of its best efforts and exhaust all reasonable options/alternatives to achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications. At a minimum, this Field Verification Program shall consider and establish, but not be limited to, the following: a) ISAS mixing procedures, rate, and durations; b) ISS design mix requirements (i.e., reagent proportions); and c) relative benefits of various ISAS mixing mediums (i.e., ambient air, steam, and oxidizing agents), as necessary.
3. This Bid Item shall include all costs associated with the preparation and submission of all required local, state, and federal permits in connection with this Work, excluding all costs associated with obtaining the requisite air quality discharge permit, which will be compensated under Bid Item 29-A. In addition, this Bid Item shall include all costs associated with the required In-Situ “Hot Spot” Treatment Work Plan and other required submittals, and this work plan shall include allowances for variations in mixing procedures, rates, and hold times. In addition, this plan shall include provisions for evaluating different mixing/reagent materials, as CONTRACTOR deems necessary and appropriate.
4. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project’s designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
5. Payment of this Bid Item shall be in full, less applicable retainage, upon completion of the specified In-situ “Hot Spot” Treatment Field Verification Program, as determined and established by the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER.

3.16 BID ITEM NO. 15-A: IN-SITU “HOT SPOT” TREATMENT POST-FIELD VERIFICATION PROGRAM STAND-BY TIME (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-situ “Hot Spot” Treatment Field Verification Program.

2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment Field Verification Program stand-by period.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all in-situ treatment equipment (i.e., no labor and material costs shall be included under this Bid Item) stand-by costs associated with the required In-Situ "Hot Spot" Treatment Field Verification Program, as specified in Section 02450 of the Technical Specifications.
2. Payment of this Bid Item shall be in full, less applicable retainage, upon completion of the specified In-situ "Hot Spot" Treatment Field Verification Program, as determined and established by the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.

3.17 BID ITEM NO. 16: IN-SITU "HOT SPOT" TREATMENT ISAS/ISS PRODUCTION OPERATIONS (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations.
2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment ISAS/ISS Production Operations.

B. Payment:

1. CONTRACTOR shall not undertake or perform any Work under this Bid Item until after the successful and satisfactory completion of Bid Item No. 15, and only upon direction of the GROUP's REPRESENTATIVE.
2. The unit price for this Bid Item shall be full compensation for all labor, equipment, and materials, excluding all labor, materials, and equipment costs in connection with the required volatile organic chemical (VOC) off-gas collection, treatment, and discharge system that will be compensated under Bid Items No. 29 and 29-A, to undertake and complete the specified In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations. Furthermore, all labor, equipment, and materials used during these production operations shall be identical to those incorporated, performance tested, and verified under Bid Item No. 15.

CONTRACT DOCUMENT ADDENDUM No. 5

Golder Associates Inc.

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943-6222

ADDENDUM NO. 5

To: Gregory S. Tunstall, P.E.

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, D. Walsh, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 5**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Friday, January 18, 2008

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 5 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

- a) Replace the “Table of Contents” (revision 0) of the Specifications in its entirety with the attached revised Table of Contents (revision 1);
- b) Replace Section 00300 “Bid Forms” (revision 0) of the Specifications in its entirety with the attached revised Section 00300 “Bid Forms” (revision 1);
- c) Replace Section 00600 “Construction Agreement” (revision 0) of the Specifications in its entirety with the attached revised Section 00600 “Construction Agreement” (revision 1);
- d) Replace Section 00610 “Performance Bond” (revision 0) of the Specifications in its entirety with the attached revised Section 00610 “Performance Bond” (revision 1);
- e) Replace Section 00620 “Payment Bond” (revision 0) of the Specifications in its entirety with the attached revised Section 00620 “Payment Bond” (revision 1);
- f) Replace Section 00700 “General Conditions” (revision 1) of the Specifications in its entirety with the attached revised Section 00700 “General Conditions” (revision 2);

3. CONTRACTOR shall undertake and complete all In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations to the spatial and vertical limits specified in the Contract Drawings and in accordance with Section 02450 of the Technical Specifications. CONTRACTOR’s unwillingness or failure to complete the specified In-Situ “Hot Spot” Treatment work in accordance with the Contract Documents will be grounds for termination, subject to the provision within the Contract Agreement.
4. The Work under this Bid Item shall be completed within a maximum duration of thirty-seven (37) Workdays, with no additional compensation for any duration of Work in excess of thirty-seven (37) Workdays. However, if CONTRACTOR completes the Work under this Bid Item within a period less than thirty-seven (37) Workdays, CONTRACTOR shall receive a fifty-percent (50%) cost sharing incentive for any approved, unused surplus quantities of this Bid Item, provided CONTRACTOR’s In-Situ “Hot Spot” Treatment activities successfully achieve the specified performance criteria.
5. This Bid Item assumes the designated “Hot Spot” will be treated in-situ, and the entire treated mass will achieve the specified performance criteria, as defined in Section of 02450 of the Technical Specifications. Therefore, this Bid Item excludes all post-treatment excavation, handling, hauling, and disposal costs of any treated materials that do not achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
6. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project’s designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
7. Progress payments, less applicable retainage, shall be made based on CONTRACTOR’s records of actual durations of Work performed under this Bid Item, which shall be submitted to the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER for favorable review and verification.
8. Final payment, less applicable retainage, of this Bid Item shall be based on the actual duration, subject to verification by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER, of the In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations plus any applicable cost sharing incentives and minus any and all previous progress payments. Furthermore, if the actual duration of In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations exceeds thirty-seven

(37) Workdays, the GROUP shall not provide any addition compensation in excess of thirty-seven (37) Workdays.

3.18 BID ITEM NO. 17: INSTALL NEW SHEET PILE WALL (SQUARE FEET)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of installed Square Feet of new steel sheet piling surface area, projected against the walls vertical axis.
2. Measurement will be made by multiplying actual linear feet of installed new steel sheet piling, along the centerline of the sheet pile wall section, by documented installed sheet pile lengths/depths, as presented on the field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER for review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the specified new steel sheet piling at the prescribed locations and minimum depths of embedment, as specified by the Contract Documents, and subsequently demolish, remove, and dispose of the uppermost portion of the existing steel sheet pile wall, as specified in the Contract Documents. CONTRACTOR shall not be compensated for any portions of new steel sheet piling that extend below the prescribed minimum embedment depths, as shown on the Contract Drawings.
2. Progress payments, less applicable retainage, shall be made based on estimated installed surface areas of new steel sheet piling, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment, less applicable retainage, shall be based on final installed surface areas of new steel sheet piling, as determined by multiplying actual linear feet of installed new steel sheet piling by documented installed sheet pile lengths/depths, as presented on the field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.19 BID ITEM NO. 18: CONSTRUCT PERIMETER ACCESS ROAD (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to complete the installation of the specified perimeter access roads, as shown on the Contract Drawings. Construction activities associated with this Work will involve, but may not be limited to, the following: subgrade preparation; installation of base geotextiles; placement of dense graded aggregates; and fine grading.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
4. No material Payment will be granted for this Bid Item.

3.20 BID ITEM NO. 19: PLACE STONE AGGREGATE AND RIP-RAP (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place Cubic Yards at actual locations of placement.
2. Measurement will be made by comparing before (i.e., prior to placement of stone aggregate and/or rip-rap materials) and after (i.e., following placement of stone aggregate and/or rip-rap materials) field record surveys, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, and grade the required stone aggregate and rip-rap materials within the perimeter drainage channels, as specified in the Contract Documents and as directed by the REMEDIAL DESIGNER.
2. Progress payments, less applicable retainage, shall be made based on estimated in-place volumes, as prepared by CONTRACTOR and

submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

3. Final payment, less applicable retainage, shall be based on the final in-place volume of stone aggregate and rip-rap material, as determined by comparing before (i.e., prior to placement of stone aggregate and rip-rap materials) and after (i.e., following placement of stone aggregate and rip-rap materials) field record surveys in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.21 BID ITEM NO. 20: INSTALL 12-IN-DIA ROAD CULVERT (LINEAR FEET)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place Linear Feet of actually installed piping.
2. Measurement will be based on actual measure lengths of installed piping, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, install, and backfill around the specified 12-in-dia. roadway culvert within the perimeter drainage channels to achieve the proposed finished ground surface elevations, as specified by the Contract Documents.
2. Progress payments, less applicable retainage, shall be made based on estimated lengths of installed piping, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment, less applicable retainage, shall be based on the final installed lengths of piping, as presented on the field record drawings prepared by CONTRACTOR and in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

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3.22 BID ITEM NO. 21: DEMOLITION (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall include full compensation for all labor and equipment to demolish the existing single-story building structure, excluding the existing floor slab and foundations, located on-Site, as identified in the Contract Drawings, and its appurtenances, and for proper characterization and disposal of all demolition materials and debris off-Site. This Bid Item shall include all identification, location, disconnecting, and decommissioning of utility services to this existing building. In addition, this Bid Item includes all necessary hazardous material surveys, abatement, and proper disposal of all non-hazardous materials off-Site.
2. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove the existing mobile trailer, as identified in the Contract Drawings, and for return of said mobile trailer to its leasing company. This Bid Item shall include all identification, location, disconnecting, and decommissioning of utility services to this existing mobile trailer.
3. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to demolish the identified existing groundwater extraction system header/piping, Above-ground Storage Tank, and associate appurtenances, as identified in the Contract Drawings, and for proper disposal of all demolition materials and debris off-Site. In addition, this Bid Item shall include the off-Site disposal of stockpiled pre-existing groundwater extraction system headers/piping, which is located south of the existing building structure to be demolished.
4. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove portions of the existing chain link fence and gates at the locations indicated on the Contract Drawings and as directed by the GROUP's REPRESENTATIVE, including off-Site disposal of the posts, fabric, and concrete, filling the remaining post holes with cover soil, and/or hydrated bentonite chips, and seeding.
5. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove the identified Investigation Derived Waste (IDW) materials that currently resides on-Site inside and around the existing building structure to be demolished. If these IDW materials satisfy the requirements of grading fill, they may

be reused on-Site, and if not reused on-Site, CONTRACTOR shall dispose of said IDW materials off-Site, and all costs associated with the characterization and off-Site disposal of any identified IDW materials shall be included under this Bid Item.

6. This lump sum price bid for this Bid Item shall include all Work identified on the Contract Drawings and in Section 02060 of the Technical Specifications. In addition, this Bid Item shall include all costs associated with the preparation and filing of any local, state, and/or federal permits required for this Work, as necessary.
7. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
8. Final payment, less applicable retainage, shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.23 BID ITEM NO. 22: WELL DECOMMISSIONING (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit actually removed.
2. Measurement will be based on actual numbers of removed wells and/or piezometers, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor and equipment to drill and backfill (i.e., with grout) all identified wells and/or piezometers requiring decommissioning, as indicated in the Contract Drawings. This Bid Item shall include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare and submit all require well decommission reports with the New Jersey Department of Environmental Protection (NJDEP).
2. Progress payments, less applicable retainage, shall be made based on actual numbers of decommissioned wells and/or piezometers, as reviewed and verified by the GROUP's REPRESENTATIVE.

3. Final payment, less applicable retainage, shall be based on the final number of decommissioned wells and/or piezometers, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.24 BID ITEM NO. 23: INSTALL NEW PERIMETER CHAIN LINK FENCE (LINEAR FOOT)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to in the units of Linear Feet of actual installed chain link fence.
2. Measurement will be based on actual lengths of installed chain link fence, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to install new chain link fencing and gates at locations indicated on the Contract Drawings, including procurement, delivery, and installation of posts, fabric, supports, gates, and barbed wire, as well as physical connections to the proposed new steel sheet pile wall, grading around the base of the post holes to promote positive drainage, and the procurement and installation of warning signs, in accordance with the requirements of the Contract Documents, and as directed by the GROUP's REPRESENTATIVE.
2. This Bid Item excludes all costs associated with the removal and disposal of any portions of the existing chain link fence and gates at the locations indicated on the Contract Drawings and as directed by the GROUP's REPRESENTATIVE, including off-Site disposal of the posts, fabric, and concrete, filling the remaining post holes with cover soil, and/or hydrated bentonite chips, and seeding. All costs associated with the removal of any portions of the existing chain link fence shall be compensated under Bid Item No. 21.
3. Except for tie wires, fabric bands, lock wires, and concrete foundations, fence materials removed may be salvaged to the extent possible for reinstallation in accordance with the Contract Documents. Fabric proposed for reuse shall be subject to favorable review by the GROUP's REPRESENTATIVE prior to reuse. CONTRACTOR shall indicate to the GROUP's REPRESENTATIVE the cost savings that can be realized by re-using the previously removed fence fabric, and this amount will be deducted from the payment application submitted following the completion of the fence installation.

4. Progress payments, less applicable retainage, shall be made based on actual lengths of installed new chain link fence, as reviewed and verified by the GROUP's REPRESENTATIVE.
5. Final payment, less applicable retainage, shall be based on the final lengths of installed new chain link fence, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
6. No material payments will be granted with this Bid Item.

3.25 BID ITEM NO. 24: INSTALL PRE-ENGINEERED METAL BUILDING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to provide "design-build" services for the design and construction of a pre-fabricated, pre-engineered metal building with all identified appurtenances (i.e., Above-ground Storage tank, compressor, controls, etc.), as specified in the Contract documents. This Bid Item includes all interior finishes, utility services (water, gas, sanitary sewer, electric, and telephone), interior mechanical, electrical, and plumbing systems, so that the building is completely operational, as intended by the GROUP. This Bid Item also includes the development of construction-level drawings for the GROUP's approval, and for obtaining all necessary local, state, and federal approvals and permits. CONTRACTOR shall identify and furnish all miscellaneous interior finish items not specified, and show proposed foundation modifications, as necessary, to suit the pre-engineered metal building structure.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
4. No material payments will be granted with this Bid Item.

3.26 BID ITEM NO. 25: INSTALL GROUNDWATER RECOVERY WELLS (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit actually installed.
2. Measurement will be based on actual numbers of new groundwater recovery wells installed, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor, equipment, and materials to drill and install the identified new groundwater recovery wells, as specified in the Contract Drawings (see Contract Drawings No. SCP-7 and SCP-8) and as directed by the Remedial Designer. This Bid Item shall include all excavation, dewatering, handling of materials, installation of vaults, access hatches, pumps, and well casings, placement of the specified filter stone around said well casings, and providing all system controls and connections to carrier pipes and pneumatic/discharge lines/headers. This Bid Item shall also include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare, submit, and obtain all necessary well drilling permits from NJDEP.
2. For purposes of bidding and payment, CONTRACTOR shall assume each new groundwater recover well will be installed twenty (20) feet beneath the proposed final grades of the new cover system, and this Bid Item includes all appropriate provisions and materials to achieve these installed depths.
3. Progress payments, less applicable retainage, shall be made based on actual numbers of new groundwater recovery wells installed, as reviewed and verified by the GROUP's REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be based on the final number of new groundwater recovery wells installed, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
5. No material payments will be granted with this Bid Item.

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3.27 BID ITEM NO. 26: INSTALL GROUNDWATER RECOVERY SYSTEM CARRIER PIPES (LINEAR FOOT)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to in the units of Linear Feet of actual installed groundwater recovery system carrier pipes.
2. Measurement will be based on actual lengths of installed groundwater recovery system carrier pipes, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the required new groundwater recovery system carrier pipes, as specified by the Contract Documents and as directed by the REMEDIAL DESIGNER. This Bid Item shall include, but may not be limited to, all excavation, temporary stockpiling of excavated materials, regrading of excess materials beneath the new soil cover system, dewatering, backfill, and compaction Work. In addition, this Bid Item shall include the installation of all pneumatic compressed air supply lines/tubing and liquid discharge lines, which reside within the "Primary" carrier pipes, as indicated on the Contract Drawings.
2. Progress payments, less applicable retainage, shall be made based on actual lengths of installed new groundwater recovery system carrier pipes, as reviewed and verified by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be based on the final lengths of installed new groundwater recovery system carrier pipes, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.28 BID ITEM NO. 27: INSTALL NEW PIEZOMETERS (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit actually installed.
2. Measurement will be based on actual numbers of new piezometers installed, as presented on the field record drawings prepared by

CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor, equipment, and materials to drill and install the identified new piezometers, as specified in the Contract Drawings (see Contract Drawings No. SCP-7 and No. SCP-8) and as directed by the Remedial Designer. This Bid Item shall include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare, submit, and obtain all necessary well drilling permits from NJDEP.
2. For purposes of bidding and payment, CONTRACTOR shall assume each new piezometer will be installed twenty (20) feet beneath the proposed final grades of the new cover system, and this Bid Item includes all appropriate provisions and materials to achieve these installed depths.
3. Progress payments, less applicable retainage, shall be made based on actual numbers of new piezometers installed, as reviewed and verified by the GROUP's REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be based on the final number of new piezometers installed, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
5. No material payments will be granted with this Bid Item.

3.29 BID ITEM NO. 28: INSTALL NON-WOVEN GEOTEXTILES (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement, which are not included under other Bid Items.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

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B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified non-woven geotextile materials, as specified in the Contract Documents.
2. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
3. Progress payments for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of non-woven geotextile materials.
4. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.
5. No material payments will be granted with this Bid Item.

3.30 BID ITEM NO. 29: IN-SITU "HOT SPOT" TREATMENT VOC OFF-GAS ACTIVATED CARBON USAGE (POUNDS)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of Pounds of activated carbon actually delivered to the Site and consumed/used over the entire duration of the specified In-situ "Hot Spot" Treatment Field Verification Program (i.e., Bid Item No. 15) and Production Operations (i.e., Bid Item No. 16).
2. Measurement will be based on actual physical weight measurements, utilizing methods established by CONTRACTOR and deemed acceptable to the REMEDIAL DESIGNER, of activated carbon delivered to the Site over the entire duration of the In-Situ "Hot Spot" Treatment Field Verification Program and Production Operations.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all labor, material, equipment, delivery, transportation, and management costs in

connection with providing, changing out, and supplying all required activated carbon required by the In-Situ “Hot Spot” Treatment VOC Collection, Treatment, and Discharge System, over the entire duration of the Field Verification Program and ISAS/ISS Production Operations, which are include under Bid Items No. 15 and 16.

2. Regardless of the actual quantity of activated carbon delivered to the Site, CONTRACTOR shall not be granted any modifications to the unit price for this Bid Item, as stipulated in the Bid Forms, and CONTRACTOR shall not be allowed to use any variations, upwards or downward from the estimated values presented in the Bid Forms, in the actual quantities for this Bid Item as cause for
3. This Bid Item shall exclude all labor, materials, and equipment costs in connection with the required In-Situ “Hot Spot” Treatment VOC Off-Gas Collection, Treatment, and Discharge System, which will be compensated under Bid Items No. 29-A.
4. This Bid Item will be for actual quantities of activated carbon used on-Site, and modifications to the unit price for this Bid Item will not be granted by the GROUP, regardless of the actual quantity of activated carbon delivered and used over the entire duration of the project.
5. Progress payments, less applicable retainage, shall be made based on estimated quantities, as prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification.
6. Final payment, less applicable retainage, shall be based on the final, actual quantities, as prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

3.31 BID ITEM NO. 29-A: IN-SITU “HOT SPOT” TREATMENT VOC OFF-GAS COLLECTION, TREATMENT, AND DISCHARGE SYSTEM (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-Situ “Hot Spot” Treatment Field Verification Program (Bid Item No. 15) and ISAS/ISS Production Operations (Bid Item No. 16).
2. Measurement will be based on the GROUP’s REPRESENTATIVE’s and/or the REMEDIAL DESIGNER’s field records, based on the actual duration of the In-situ “Hot Spot” Treatment Field Verification Program and ISAS/ISS Production Operations.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all labor, materials, and equipment costs in connection with the required In-Situ “Hot Spot” Treatment VOC Collection, Treatment, and Discharge System, over the entire duration of the Field Verification Program and ISAS/ISS Production Operations, which are include under Bid Items No. 15 and 16, respectively.
2. The Work under this Bid Item shall be completed within a maximum of forty-seven (47) Workdays, with no additional compensation for any Work in excess of a total of forty-seven (47) Workdays.
3. This Bid Item shall include all costs associated with preparing, submitting, and obtaining the required air quality discharge permit from the New Jersey Department of Environmental Protection (NJDEP). In addition, this Bid Item shall include all field and laboratory-testing costs in connection with the VOC Collection, Treatment, and Discharge System, as required by the Contract Documents and/or NJDEP.
4. This Bid Item shall exclude all labor, material, equipment, delivery, transportation, and management costs in connection with providing, changing out, and supplying all required activated carbon required by the In-Situ “Hot Spot” Treatment VOC Off-Gas Collection, Treatment, and Discharge System, which will be compensated under Bid Items No. 29.
5. Progress payments, less applicable retainage, shall be made based on CONTRACTOR’s records of actual durations of Work performed under this Bid Item, which shall be submitted to the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER for favorable review and verification.
6. Final payment, less applicable retainage, of this Bid Item shall be based on the actual duration, subject to verification by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER, of the In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations minus any and all previous progress payments. Furthermore, if the actual combined total duration of In-Situ “Hot Spot” Treatment Field Verification Program and ISAS/ISS Production Operations exceeds forty-seven (47) Workdays, the GROUP shall not provide any addition compensation in excess of forty-seven (47) Workdays.

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3.32 BID ITEM NO. 30: MANAGEMENT AND DISPOSAL OF SURFACE AND DECONTAMINATION FLUIDS (GALLON)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of actual Gallons of surface and/or decontamination fluids disposed off-Site.
2. Measurement will be made based on actual volumetric measurements, utilizing flow meters, depth gauges with storage tanks, or other means deemed acceptable to the REMEDIAL DESIGNER, of surface and decontamination fluids disposed of off-Site.

B. Payment:

7. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to collect, manage, handle, transfer to on-Site storage tanks, and dispose off-Site all surface water that came in contact with existing on-Site waste materials and all decontamination fluids generated over the course of the CONTRACTOR's construction activities, as specified by the Contract Documents.
8. Off-site disposal of all surface water and decontamination fluids shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the unit price bid for this Bid Item shall include all necessary testing and characterization costs, as required by the designated disposal facility.
9. Progress payments, less applicable retainage, shall be made based on estimated volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
10. Final payment, less applicable retainage, shall be based on the final, actual volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

3.33 BID ITEM NO. 31: MANAGEMENT AND DISPOSAL OF GROUNDWATER (GALLON)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of actual Gallons of groundwater disposed off-Site.

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2. Measurement will be made based on actual volumetric measurements, utilizing flow meters, depth gauges with storage tanks, or other means deemed acceptable to the REMEDIAL DESIGNER, of groundwater disposed of off-Site.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to collect, manage, handle, transfer to on-Site storage tanks, and dispose off-Site all groundwater generated over the course of the CONTRACTOR's construction activities, as specified by the Contract Documents.
2. Off-site disposal of all surface water and decontamination fluids shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the unit price bid for this Bid Item shall include all necessary testing and characterization costs, as required by the designated disposal facility.
3. Progress payments, less applicable retainage, shall be made based on estimated volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment, less applicable retainage, shall be based on the final, actual volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

PART 4 – ALTERNATE CONTRACT PAYMENT ITEMS

4.01 ALTERNATE BID ITEM NO. 16-A: IN-SITU "HOT SPOT" TREATMENT EXCAVATION, OFF-SITE DISPOSAL, AND BACKFILL OF TREATED MASS (TON)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of actual measured Tons of ISAS/ISS treated materials from the designated In-Situ "Hot Spot" Treatment area.
2. Measurement will be based on actual measurements, utilizing methods established by CONTRACTOR and deemed acceptable to the REMEDIAL DESIGNER, of actual treated materials excavated and disposed off-Site.

B. Payment:

1. CONTRACTOR shall not undertake or perform any Work under this Bid Item until after completion of Bid Item No. 15, and only upon direction of the GROUP's REPRESENTATIVE.
2. This Bid Item assumes the designated "Hot Spot" will be treated in-situ, but the specified In-Situ "Hot Spot" Treatment performance criteria, as defined in Section of 02450 of the Technical Specifications, cannot be reasonably achieved to the satisfaction of the USEPA and NJDEP. Therefore, this Bid Item includes all post-treatment excavation, handling, hauling, characterization, disposal, backfill, and compaction costs for those portions of the treated mass that do not achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
3. This Bid Item shall also include all additional health and safety measure, air emission control, and quality control costs required during the post-treatment excavation and off-Site disposal operations. In addition, this Bid Item shall include all costs associated with the infilling of these post-treatment excavations, including the import of additional grading fill, as necessary, and all backfilling and compaction costs, as required.
4. Those portions of the treated mass that do achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications shall remain on-Site, and payment for these portions of the Work will be compensated under Bid Item No. 16.
5. Progress payments, less applicable retainage, shall be made based on estimated quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
6. Final payment, less applicable retainage, shall be based on the final, actual quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

*** END OF SECTION ***

SECTION 01026

SCHEDULE OF VALUES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. The Work of this Section includes the preparation and submittal of a Schedule of Values.

1.02 RELATED SECTIONS

- A. 00300 – Bid Forms
- B. 01027 – Application for Payment
- C. 01300 – Submittals

1.03 GENERAL

- A. CONTRACTOR shall submit a draft Schedule of Values to the GROUP'S REPRESENTATIVE for approval within thirty (30) days of the Notice to Intent to Award.
- B. Timing of Submittal: Submit to the GROUP'S REPRESENTATIVE a final Schedule of Values allocated to the various portions of the Work within ten (10) days after the Notice to Proceed. The first progress payment will not be made until at the GROUP'S REPRESENTATIVE'S approval of the CONTRACTOR'S values.
- C. Supporting Data: Upon request of the GROUP'S REPRESENTATIVE, support the values with data, which will substantiate their correctness.
- D. Use of Schedule: The Schedule of Values, unless objected to by the GROUP'S REPRESENTATIVE, shall be used only as a basis of the CONTRACTOR'S Application for Payment. In-progress payments will be based on Work completed.
- E. Payment will be made only for completed and accepted Work in place.

1.04 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Form and Identification
 - 1. The CONTRACTOR'S standard forms and automated printout may be utilized.
 - 2. Identify the Schedule of Values with:
 - a. Project title and location;
 - b. GROUP;
 - c. Name and address of CONTRACTOR;

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- d. Contract designation;
 - e. Date of submission; and,
 - f. Change Order number.
- B. The Schedule of Values shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction. Breakdown shall be by structure, then by Construction Specification Institute (CSI) Format, for ease of field verification of quantities completed in each structure.
- C. Format
- 1. Follow the Bid Forms (Section 00300) of the Bidding Documents and Specifications as the format for listing the component items.
 - 2. Identify each item with the number and title of the respective major section of the Specifications.
- D. For each major line item, list sub-values of major products or operations under the item.
- E. For the various portions of the Work, each item shall include a directly proportional amount of the CONTRACTOR's burden, overhead, and profit.
- F. The sum of all values listed in the Schedule of Values shall equal the total Contract sum.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

***** END OF SECTION *****

SECTION 01027

APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.01 PURPOSE

- A. The purpose of this Section is to outline the procedures for the preparation and submittal of Applications for Payment by the CONTRACTOR.

1.02 RELATED SECTIONS

- A. 00300 – Bid Forms
- B. 01025 – Measurement and Payment
- C. 01026 – Schedule of Values
- D. 01300 – Submittals
- E. 01700 – Contract Closeout

1.03 FORMAT

- A. AIA G702 – Application and Certificate for Payment including continuation sheets when required, or alternative as accepted by the REMEDIAL DESIGNER.
- B. CONTRACTOR may submit to the REMEDIAL DESIGNER, for approval, an alternate payment application format.
- C. For each item, provide a column for listing: Item Number; Description of Work; Scheduled Value; Previous Applications; Work in Place and Stored Materials under this Application; Authorized Change Orders; Total Completed and Stored to Date of Application; Percentage of Completion; Balance to Finish; and, Retainage.

1.04 PREPARATION OF APPLICATIONS

- A. Present required information on electronic media printout acceptable to the REMEDIAL DESIGNER.
- B. Execute certification by signature of authorized officer.
- C. Use data from the approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
- D. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.

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- E. Prepare the Application for Final Payment as specified in Section 01700 of these Specifications.

1.05 SUBMITTAL PROCEDURES

- A. Submit each Application for Payment to the REMEDIAL DESIGNER for verification and acceptance of the information provided. The REMEDIAL DESIGNER will submit each Application for Payment to the GROUP's REPRESENTATIVE for final payment approval.
- B. Provide one (1) original and two (2) copies of each Application for Payment. The individual documents shall be so marked so as to distinguish the original and the copy. Copies may be submitted electronically.
- C. Submit an updated Construction Schedule with each Application for Payment.
- D. Payment Period: Monthly, unless otherwise specified.
- E. Submit under transmittal letter as specified in Section 01300 of these Specifications.
- F. Submit one (1) set of As-Built Drawings with each Application for Payment, as specified in Section 01300 of these Specifications.
- G. Submit required waivers.
- H. Applications for Payment will not be processed unless the application is complete, in compliance with the requirements of this Section, and the Project Record Documents are up-to-date and complete.
- I. Payment shall be within thirty (30) days of submittal and acceptance by the REMEDIAL DESIGNER and approval by the GROUP's REPRESENTATIVE.

1.06 SUBSTANTIATING DATA

- A. When the REMEDIAL DESIGNER and/or the GROUP's REPRESENTATIVE require substantiating information, submit data justifying the dollar amounts in question.
- B. Provide one (1) copy of the data with cover letter for each copy of the submitted Application for Payment. The cover letter shall include the number and date of the Application for Payment for which the substantiating data has been requested, and the line item(s), by number and description, for which the data substantiates.

PART 2 – PRODUCTS

Not Used.

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PART 3 – EXECUTION

Not Used.

***** END OF SECTION *****

SECTION 02460

STEEL SHEET PILING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. CONTRACTOR shall furnish all labor, equipment, materials, tools, and appurtenances, and perform all operations necessary for installing steel sheet piles, as indicated on the Contract Drawings and as specified herein.
- B. CONTRACTOR shall comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, State, or Federal authorities having jurisdiction. CONTRACTOR is responsible for identifying and obtaining all appropriate licenses, approvals, and permits to complete the work of this Section. CONTRACTOR shall provide a “Competent Person” to implement, supervise, and inspect the Work.
- C. CONTRACTOR shall locate all existing active and abandoned utilities and structures in designated Work areas prior to commencing any steel sheet pile installations. CONTRACTOR shall also protect from damage those utilities and structures which are to remain in place.
- D. Given the critical nature and general instability of the existing steel sheet pile wall system along Peach Island Creek, CONTRACTOR shall take all appropriate precautions, as it deems necessary, to protect the existing steel sheet pile wall system and prevent any induced lateral and/or rotational movements of this wall, under any applied construction material and equipment loads.
- E. CONTRACTOR shall be responsible for maintaining the integrity of the existing perimeter slurry wall system, and shall take all appropriate precautions, it deems necessary, to protect said slurry wall system. If the integrity of the existing perimeter slurry wall system is compromised, due to CONTRACTOR’s actions or any Work performed under this Contract Agreement, CONTRACTOR shall repair and/or replace, at its own cost, said impacted slurry wall sections in kind and to acceptance of the REMEDIAL DESIGNER.

1.02 RELATED SECTIONS

- A. 01050 – Field Engineering/Surveying
- B. 01564 – Health and Safety
- C. 02100 – Site Preparation
- D. 02220 – Excavation
- E. 02223 – Backfill and Fill
- F. 02831 – Chain Link Fence and Gates

1.03 REFERENCES

The latest editions of the publications listed below form part of these Technical Specifications:

- A. American Welding Society (AWS):
 - 1. AWS D1.1/D1.1M – Structural Welding Code (Steel).

- B. ASTM International (ASTM):
 - 1. ASTM A328/A328M – Steel Sheet Piling.
 - 2. ASTM A572/A572M – High-Strength, Low-Alloy Columbium-Vanadium Structural Steel.
 - 3. ASTM A6/A6M – General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 - 4. ASTM A690/A690M – High-Strength, Low-Alloy Steel H-Piles and Sheet Piling for Use in Marine Environments.
 - 5. ASTM A857/A857M – Steel Sheet Piling, Cold-Formed, Light Gage
 - 6. ASTM A36/A36M – Carbon Structural Steel.

1.04 SUBMITTALS

- A. Sheet Pile Wall Installation Work Plan: Prior to commencement of steel sheet piling installation activities on-Site, CONTRACTOR shall prepare and submit, to the GROUP's REPRESENTATIVE, a detailed, comprehensive steel sheet pile installation work plan, which includes, but not limited to, the following:
 - 1. CONTRACTOR and/or SUBCONTRACTOR Qualifications;
 - 2. Methods and sequences of construction;
 - 3. Material storage and lay-down areas;
 - 4. Complete descriptions of sheet piling driving equipment, including hammers, extractors, protection caps, and other installation appurtenances;
 - 5. Proposed methods of extracting, pulling and/or re-driving of installed steel sheet piling;
 - 6. Manufacturer and/or supplier product data sheets; and
 - 7. Material certificates.

- B. Shop Drawings: Prior to commencement of steel sheet piling installation activities on-Site, CONTRACTOR shall prepare and submit, to the GROUP's REPRESENTATIVE, detailed drawings for the specified steel sheet piling, including fabricating sections. These drawings shall show complete piling dimensions and details, driving sequences, and locations of installed piling. These drawings shall include details of top protection, special reinforcing tips, tip protection, lagging, splices, fabricated additions to plain piles, cut-off methods, and dimensions of templates and other temporary guide structures for installing

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piling. Drawings shall provide details of the methods of handling piling to prevent permanent deflection, distortion, or damage to piling interlocks.

- C. Records: CONTRACTOR shall prepare, maintain, and submit, to the GROUP's REPRESENTATIVE, complete records of the completed sheet piling driving operations. These records shall provide a system of identification that shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions, and top and bottom elevations of installed piling.
- D. Manufacturer's Mill Certificates: For each shipment of material, CONTRACTOR shall submit, to the GROUP's REPRESENTATIVE, copies of all Manufacturer certified material test reports, showing that the sheet piling and appurtenant metal materials meet the specified requirements. These mill certificates shall be submitted for each shipment of material, and corresponding lot numbers for each shipment shall be clearly noted on said certificates. Material test reports shall meet the requirements of ASTM A6/A6M. Identification data shall include, but not be limited to, piling types, dimensions, chemical compositions, mechanical properties, section properties, heat numbers, and mill identification marks.
- E. Submit in accordance with Section 01300 of these Technical Specifications.

1.05 DELIVERY, HANDLING AND STORAGE

- A. Materials delivered to the Site shall be new and undamaged, and shall be accompanied by the Manufacturer's mill certification reports.
- B. Sheet piling shall be stored and handled in the manner recommended by the Manufacturer to prevent permanent deflection, distortion, or damage to the interlocks. At a minimum, CONTRACTOR shall support all sheet piling on level blocks or racks spaced not more than ten (10) feet apart, and not more than two (2) feet from the ends.
- C. Concentrated loads that occur during stacking or lifting shall be limited to less than those that could produce permanent deformation of the material.
- D. Sheet pile handling devices shall be designed such that damage to protective coatings applied to the steel sheets is prevented.
- E. Storage of steel sheet piling shall be in such a manner to facilitate required inspection activities.

1.06 EQUIPMENT

- A. CONTRACTOR shall submit complete descriptions of the driving equipment, including caps, leads, and guides where required. The description of the hammer proposed for driving piles shall include make and model number.
- B. CONTRACTOR shall not be allowed to position any construction material or equipment loads within a forty (40) feet horizontal offset area behind the existing steel sheet pile wall, as measured from the top of the wall, unless specifically directed or approved otherwise by the REMEDIAL DESIGNER.
- C. CONTRACTOR shall select the pile driving method and equipment such that existing buildings and structures, as specified in Sub-Section 1.08 herein, are protected against damage due to vibration and settlement that may be caused by the pile driving operation.
- D. CONTRACTOR shall make such substitutions and modifications, found to be necessary during the progress of the work, as approved by the REMEDIAL DESIGNER.

1.07 DESIGNING AND DETAILING

- A. The locations, arrangements, lengths, and cross sections of steel sheets shall be as shown/indicated on the Contract Drawings.
- B. CONTRACTOR shall design and detail all corners, wyees, and other special shapes, connections, and appurtenant items necessary to make the sheet pile retaining wall complete.
- C. CONTRACTOR shall submit detail drawings, including design computations, to the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER for approval.

1.08 PROTECTION OF PEOPLE AND PROPERTY

- A. CONTRACTOR shall plan and conduct its operations and take all necessary precautions to prevent damage to existing utilities, structures, roads, grades, slopes, surface water drainage features, underground piping, manholes, monitoring wells, piezometers, and other site features; to safeguard people and property; to minimize traffic inconvenience; to minimize dust and odors; and to provide safe working conditions. CONTRACTOR shall repair, to the GROUP's REPRESENTATIVE's satisfaction, and at no additional expense or delay to the GROUP, any and all damage which occurs as a result of the excavation work.

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PART 2 – PRODUCTS

2.01 STEEL SHEET PILING

- A. Steel sheet piles shall be hot-rolled, and conform to ASTM A572/A572M, Grade 50.
- B. Provide and install AZ-18, or approved equivalent, steel sheet pile sections. These sheet piles shall have minimum effective Section Modulus (S_{xx}) and Moment of Inertia (I_{xx}) values of 33.5 in³/foot and 250.4 in⁴/foot, respectively.
- C. All steel sheet piling shall be installed at the locations and to the depths shown on the Contract Drawings.
- D. Sheet piling interlocks shall be free-sliding, provide swing angles suitable for the intended installation, but not less than three (3) angular degrees when interlocked, and maintain continuous interlocking when installed.

2.02 APPURTENANT MATERIALS

- A. Metal plates, shapes, bolts, nuts, rivets, and other appurtenant fabrication and installation materials shall conform to Manufacturer's standards, and to the requirements specified in the respective sheet piling standards.
- B. Structural and miscellaneous steel shall conform to ASTM A36/A36M.

PART 3 – EXECUTION

3.01 ALIGNMENT AND TOLERANCES

- A. CONTRACTOR shall furnish necessary surveying services for establishing sheet piling locations, in accordance with Section 01050 of these Technical Specifications.
- B. Any sheet piles driven/installed more than three (3) inches from the locations indicated on CONTRACTOR's approved steel sheet piling shop drawings will be rejected.
- C. Sheet piling shall be driven plumb, and shall not deviate from the vertical by more than 1/8-inch-per-foot. If at any time, the sheet piles are found to be out of plumb CONTRACTOR shall immediately take corrective measures to bring the effected sheet piles back into specified tolerances to ensure plumbness of the succeeding piles are not effected.
- D. Prior to undertaking any corrective measures, CONTRACTOR shall submit its proposed methods, to the REMEDIAL DESIGNER for approval, to correct sheet

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pile sections that are out of alignment or plumbness. All corrective measures shall not compromise the capability of the interlocks.

- E. CONTRACTOR shall provide suitable guide structures to ensure that piles and driving equipment are properly aligned during driving. Guide structures shall be equipped with suitable devices to avoid damaging protective coating of sheet piles, as necessary.
- F. Costs associated with corrective actions and/or removing/re-driving of rejected sections of steel sheet piling shall be at CONTRACTOR's own cost, and not reimbursed by the GROUP.

3.02 DRIVING

- A. Sheet piles shall be driven in sections and sequence as may be indicated on the Contract Drawings and as specified herein.
- B. Prior to driving sheet piles, existing obstructions and utilities shall be located and removed.
- C. No sheet piles shall be driven within fifty (50) feet of newly placed concrete which is less than forty-eight (48) hours old.
- D. All steel sheet piles shall be driven to or below the tip elevations (i.e., toe-of-wall) indicated on the Contract Drawings.
- E. Protective caps shall be used during driving operations, as required by the REMEDIAL DESIGNER, to prevent damage to the top of the sheet piles.
- F. Sheet piling driven to the required depth and extending above the specified top of wall elevations, as indicated on the Contract Drawings, shall be trimmed off at the top of wall elevation noted on the Contract Drawings. The CONTRACTOR shall trim the tops of all damaged sheet piles, which interfere with the driving activities or detrimentally affect appearance, if exposed in the finished work.
- G. If piles driven to the required depth are too short to reach the required top elevation, said effected sheet piles shall be extended by splicing. CONTRACTOR shall submit its splicing procedures, as necessary and as part of its shop drawing submission.
- H. Each sheet pile shall be interlocked with adjoining sheet piles for its entire length. Where ball and socket interlocks are indicated on the Contract Drawings, piles shall be driven with the ball edge leading. Sheet piles driven out of interlock with adjacent sheet piles shall be removed and replaced with new sheet piles.
- I. If the driving of a sheet pile tends to drag an adjacent sheet pile below grade, it shall be reported to the REMEDIAL DESIGNER, prior to taking any corrective

actions. Corrective actions shall be as approved by the REMEDIAL DESIGNER.

- J. Jetting of steel sheet pile section will not be permitted on this project.
- K. Where boulders or other obstructions render it impracticable to drive sheet piles to the required depth, CONTRACTOR shall stop further driving, and submit its procedures to remove the obstructions or propose a re-designed configuration.
- L. CONTRACTOR shall maintain and submit records of driving. Driving records shall include alignment and verticality checks, location of splices and inspection of splice welds, and shall note driving equipment used and locations and depths where difficulty in driving was encountered.
- M. The hammer selected to drive the sheet piles shall be shown to limit the induced stresses in the sheet piles to less than 90% of the yield stress of the pile material.
- N. Each pile section (or pair of sheets) shall not be driven more than five (5) feet ahead of the adjacent sections.
- O. Open socket ends shall be kept free of soil during driving.

3.03 SPLICES

- A. Splices in sheet piling, as approved by the REMEDIAL DESIGNER, shall be full-penetration butt-welded. No more than one (1) splice per sheet will be allowed. When adjacent piles are to be spliced, splices shall be staggered not less than ten (10) feet apart in elevation.
- B. Splices shall be fabricated to assure alignment of the spliced parts. Change in slope between parts spliced shall not exceed 1/500.
- C. CONTRACTOR shall utilize welding procedure in accordance with AWS D1.1. CONTRACTOR shall provide inspection of welding, and shall submit qualification records of welders and welding procedures.

3.04 SEALING

- A. All handling holes in the sheet pile shall be sealed using steel plate having the same thickness as the sheet pile. Steel plate shall be seal welded all around.
- B. All exposed interlock joints shall be sealed using Volclay Joint Seal as manufactured by American Colloid Company or approved equal. Application of joint seal shall be in accordance with the manufacturer's recommendations.

***** END OF SECTION *****

CONTRACT DOCUMENT ADDENDUM No. 6

Golder Associates Inc.

The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Telephone (973) 645-1922
Fax (973) 645-1588
www.golder.com



943-6222

ADDENDUM NO. 6

To: Gregory S. Tunstall, P.E.

From: Mark F. McNeilly, P.E.

C.c.: S. Finn, B. Illes, D. Walsh, file

Re: **CONTRACT DOCUMENTS – ADDENDUM NO. 6**
216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY

Date: Friday, February 1, 2008

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), Golder Associates Inc. (Golder) is pleased to issue Addendum No. 6 to the Contract Documents for the implementation of the 216 Paterson Plank Road Superfund Site Operable Unit No. 2 (OU-2) Final Remedy.

In particular, the Contract Documents for the subject OU-2 Final Remedy Contract are hereby revised/modified as follows:

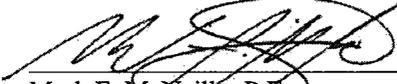
- a) Replace Section 00020 “Invitation to Bidders” (revision 1) of the Specifications in its entirety with the attached revised Section 00020 “Invitation to Bidders” (revision 2);
- b) Replace Section 00100 “Instructions to Bidders” (revision 0) of the Specifications in its entirety with the attached revised Section 00100 “Instructions to Bidders” (revision 1);
- c) Replace Section 00300 “Bid Forms” (revision 1) of the Specifications in its entirety with the attached revised Section 00300 “Bid Forms” (revision 2);
- d) Replace Section 00700 “General Conditions” (revision 2) of the Specifications in its entirety with the attached revised Section 00700 “General Conditions” (revision 3);
- e) Replace Section 00800 “Supplementary Conditions” (revision 1) of the Specifications in its entirety with the attached revised Section 00800 “Supplementary Conditions” (revision 2);
- f) Replace Section 01015 “Definitions” (revision 1) of the Specifications in its entirety with the attached revised Section 01015 “Definitions” (revision 2);
- g) Replace Section 01025 “Measurement and Payment” (revision 2), in its entirety with the attached revised Section 01025 “Measurement and Payment” (revision 3); and

- h) Replace Section 02460 “Steel Sheet Piling” (revision 2) of the Specifications in its entirety with the attached revised Section 02460 “Steel Sheet Piling” (revision 3).

Please review all of the above new, modified Specification Sections in their entirety. In addition, please complete and reissue the modified Bid Forms (Section 00300), so we can prepare and issue the final Contract package for signatures and execution, and issue the Notice to Proceed as-soon-as-possible.

If anyone has any questions or requires additional information, please feel free to contact the undersigned at (973) 645-1922 (ext. 31303).

PREPARED BY:



Mark F. McNeilly, P.E.
Practice Leader and Associate

SECTION 00020

INVITATION TO BIDDERS

The 216 Paterson Plank Road Cooperating PRP Group (hereinafter referred to as the “GROUP”), hereby requests written response to this Request for Proposal (RFP) for the following:

- Project Title:** 216 Paterson Plank Road Superfund Site
Operable Unit No. 2 (OU-2) Final Remedy
- GROUP:** 216 Paterson Plank Road Cooperating PRP Group
- Location:** 216 Paterson Plank Road
Borough of Carlstadt, Bergen County, New Jersey
- Summary of Work:** See Section 01010 of the Specifications
- Schedule:**
- | | |
|--|--------------------|
| Issue Request for Proposals (RFP)..... | September 5, 2007 |
| Pre-Bid Meeting and Site Visit | September 12, 2007 |
| Bid Questions Due | September 28, 2007 |
| Issue Responses to Questions | October 3, 2007 |
| Bids Due | October 10, 2007 |
| Notice of Award | January 31, 2008 |
| Contractor Mobilization ** | April 24, 2008 |
| Complete Construction ** | January 15, 2009 |
- ** (Note: The above schedule dates are tentative, and subject to change/modification and CONTRACTOR’s accepted Baseline Construction Progress Schedule.)

Bidding Documents:

The Bidding Documents consist of the following:

- a) Contract Drawings;
- b) Specifications and Technical Specifications;
- c) Supplemental Reference Documents, consisting of:
 - Construction Quality Assurance Plan (CQAP) for the OU-2 Final Remedy;
 - Record of decision (ROD), issued by USEPA, dated August 12, 2002, for the OU-2 Final Remedy; and
 - Kiber Environmental Services, Inc. “216 Paterson Plank Road Site – Treatability Study – Final Report”, dated July 2000.
- d) All issued Addenda to the Contract Documents.

See Section 00200 of the Specifications for a listing of additional information available to BIDDERS, which may be viewed at the offices of the REMEDIAL DESIGNER or designated public repositories, if applicable.

Sealed Bids, in accordance with the Contract Documents, will be received until 5:00 PM (EST) on October 10, 2007, and Bids and all communications relative to this RFP shall be directed to:

216 Paterson Plank Road Cooperating PRP Group
c/o Golder Associates Inc.
Attn: Mr. Mark F. McNeilly, P.E.
The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey, 07102.
Phone: (973) 645-1922
Fax: (973) 645-1588
Email: mark_mcneilly@golder.com

The envelopes in which the Bids are submitted shall be sealed and labeled "Bid for 216 Paterson Plank Road Superfund Site – Operable Unit No. 2 (OU-2) Final Remedy". Bids received after the time and date set forth above may be rejected, at the GROUP's discretion, and the GROUP will not be responsible for any delays caused by the United States Postal Service, Federal Express, UPS, or other delivery services/vehicles.

All requisite information, as specified in the Contract Documents, shall be supplied, as a complete Bid Proposal, for evaluation by the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER.

Furthermore, the GROUP intends to select a successful BIDDER, and issue a Notice of Award (NOA) on or around January 31, 2008. Following issuance of the NOA, the GROUP intends to conclude Contract negotiations and issue a Notice to Proceed (NTP), which shall include the stipulated commencement date for the Work, on or before February 14, 2008.

There will be a mandatory Pre-Bid Meeting and Site Visit for all BIDDERS on September 12, 2007 at 11:00 AM (EST). This meeting will be held at the Site, and will convene inside the entrance gate located at 216 Paterson Plank Road in the Borough of Carlstadt, Bergen County, New Jersey. Up to three (3) representatives (max.) from each Bidder may participate in this Pre-Bid Meeting. If any BIDDER requires directions to the Site, please contact the above noted project contact.

Each Bidder is required to attend this Pre-Bid Meeting and Site Visit to become familiar with local conditions, facilities, construction, and labor, so that potential difficulties and restrictions that might arise during execution of the Work under this Agreement are fully understood. Bids from BIDDERS who have not attended this Pre-Bid Meeting will not be accepted.

This letter and bidding documents are considered confidential, and are provided only as Bidding Documents for the procurement of remedial construction services. If any BIDDER chooses not to submit a Bid, please provide written notification, to the above noted project contact, of your intent not to submit a Bid. In addition, all bidding documents shall be returned within seven (7) days of any "no bid" notification.

Bids will be opened privately on or after the Bid due date. The GROUP reserves the right, at its discretion, to reject any and all proposals and/or to waive any informality in any Bid or the bidding process. Bidding will be by invitation only, at the GROUP's discretion.

The GROUP may conduct such investigations, as it deems necessary, to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of any BIDDER, SUBCONTRACTOR, or vendor. Each BIDDER shall furnish the GROUP with all such information, as may be requested, for this purpose.

Requests by BIDDERS for explanation, interpretation, and/or clarification of the Contract Drawings, Specifications, and/or other Contract Documents shall be submitted, in writing, to the above noted project contact. No response will be made to any inquiries received later than the close of business (i.e., 5:00 PM) on September 28, 2007, and the person(s) submitting said requests shall be responsible for their timely delivery.

Interpretations and/or explanations of the Contract Documents will only be made in writing, and copies of which will be mailed, emailed, or delivered via facsimile to all listed holders of the Bidding Documents by October 3, 2007. At the BIDDER's request, interpretations may be transmitted electronically (via facsimile or e-mail).

The GROUP will not be bound by any explanations, clarifications, or interpretations conveyed to the BIDDERS that are not incorporated into the Contract Documents by Addenda.

***** END OF SECTION *****

SECTION 00100

INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

1.01 DEFINED TERMS

- A. Terms used in these “Instructions to Bidders” have the meanings assigned to them in the Section 01015 of the Specifications.
- B. The term "BIDDER" refers to a CONTRACTOR who submits a Bid directly to the GROUP, as distinct from a sub-BIDDER, who submits a bid to a BIDDER.
- C. The term "Successful BIDDER" means the responsible BIDDER to whom the GROUP (on the basis of the GROUP's evaluation as hereinafter provided) makes an award.

1.02 COPIES OF BIDDING DOCUMENTS

- A. Complete sets of Bidding Documents shall be used in preparing Bids; neither the GROUP, the GROUP's REPRESENTATIVE, nor the REMEDIAL DESIGNER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- B. The GROUP and the GROUP's REPRESENTATIVE, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the Work, and do not confer a license or grant for any other use.

1.03 RECEIPT OF BID PROPOSALS

- A. All Bids shall be submitted in sealed, opaque envelopes clearly labeled “Bid for 216 Paterson Plank Road Superfund Site – Operable Unit No. 2 (OU-2) Final Remedy” along with the name and address of BIDDER.
- B. Bids forwarded by mail shall comply with above, but shall be forwarded to the mailing address indicated in Section 00020 of the Specifications, and shall be enclosed inside another outer envelope properly addressed for mailing.
- C. The time scheduled for the receipt of Bid Proposals shall be in accordance the requirements stipulated in Section 00020 of the Specifications.
- D. The GROUP reserves the right to reject any Bid proposal at any time.

1.04 PREPARATION OF BID PROPOSAL

- A. Bid Forms (Section 00300 of the Specifications) are included with the Bidding Documents. BIDDERS are required to use these forms and submit complete Bid Proposals, sealed and intact, to the GROUP. For those Bid items that have options, BIDDER shall provide unit price information/data for both options/alternatives. The GROUP reserves the right to choose any of the options for any of the identified Bid items.
- B. One (1) original and two (2) hard copies of the Bid Proposal shall be submitted. In addition, BIDDERS shall submit one (1) electronic (i.e., PDF file format) copy of their Bid Proposal. All blank spaces within the requisite Bid Forms must be filled in, as noted, in “blue” or “black” ink. Bids must give unit prices in figures for each Bid item, as presented in the Bid forms, with amounts extended and totals given in both figures and words, where required. No changes shall be made to the Bid Forms or to the items listed/identified therein. Erasures and other changes to the Bid Forms shall be explained or noted over the initials of BIDDER. In the event of any discrepancy between the written amounts and the figures, the written amounts shall govern.
- C. BIDDERS shall sign their Bid Proposal in the locations provided for this purpose in the Bid Submittal Letter (Section 00140 of the Specifications) and Bid Forms (Section 00300 of the Specifications). If any Bid Proposal is made by a partnership or corporation, the name and address of the partnership or corporation shall be indicated, together with the names and addresses of the partners or officers. If the proposal is made by a partnership, it shall be acknowledged by one (1) of the partners; if made by a corporation, by one (1) of its officers.
- D. Bidders shall furnish, with their Bid Proposals, the following documents:
 - 1. Signed, dated, and sealed Bid Forms and Bid Submittal Letter, as provided in the Contract Documents.
 - 2. A schedule of rates for labor, equipment, and materials to serve as the basis for establishing an adjusted Contract price, as a result of changes in or additions to the required Work. Each rate shall be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR’s overhead and profit for each separately identified item.
 - 3. A statement of BIDDER’s qualifications and relevant experience, unless submitted previously to the GROUP. Statements of Qualifications and experience shall also be provided for all SUBCONTRACTORS who will be engaged in Work on the Site, unless submitted previously to the GROUP.
 - 4. Current Certificate of Insurance evidencing the required coverage.
 - 5. Current financial reports, including any notes.
 - 6. A statement of the proposed Site Superintendent/Supervisor's experience on similar projects, with the names of three (3) different clients, contact persons, and respective telephone numbers.
 - 7. A statement of the proposed on-Site Health and Safety Officer’s experience on similar projects.

8. A list of names, addresses, and telephone numbers of borrow sources for fill material, subject to approval of the GROUP.
9. A list of all major items of equipment, including make, model and age, which Bidder proposes to employ on-Site in performing the Work.
10. A detailed Baseline Construction Progress Schedule.
11. Acknowledgment of receipt of all Addenda.
12. A separate narrative and costs outlining any items that the BIDDER believes are not identified in the Bid Forms (Section 00300 of the Specifications) and Section 01025 of the Specifications.
13. Each Bid shall state any assumptions or limitations, including any proposed exceptions to the Contract terms and conditions, that BIDDER believes are necessary to clarify its Bid.
14. A narrative describing the methods proposed to conduct the Work. In particular, BIDDER shall further describe its qualifications, experience, approach, and anticipated sequences of construction related to the specified In-Situ “Hot Spot” Treatment Work.
15. A copy of OSHA 200 logs and Experience Modifications Rating (EMR) for the last three (3) years, unless previously submitted to the GROUP.
16. A summary of BIDDER’s litigation history relating to past work performed over the last five (5) years.

1.05 OBLIGATION OF BIDDER

- A. Each BIDDER is presumed to have thoroughly and completely inspected the Site of the Work, and to have read and be thoroughly familiar with the Contract Documents (including all Addenda). The failure or omission of any BIDDER to receive or examine any form, instrument, or document, or to inspect the Site of the Work, shall in no way relieve any BIDDER from any obligation with respect to its Bid.
- B. Each BIDDER shall attend the mandatory Pre-Bid Meeting, as described in Section 00020 of the Specifications and visit the Site, prior to submitting its Bid, to become familiar with existing Site conditions. Verbal statements or comments discussed at this Pre-Bid Meeting shall not, in any way, modify the Bidding Documents.
- C. Each BIDDER shall make itself fully informed of the construction and labor conditions under which the Work will be performed, including all applicable Federal, State, and local laws and regulations. Failure to do so will not relieve the Successful BIDDER of its obligations to furnish all material and labor necessary to carry out the provisions of the Contract Documents and to complete the contemplated Work for the consideration set forth in its Bid. CONTRACTOR in carrying out its Work shall employ such methods or means as will not cause any interruption of, or interference with, the Work of any other CONTRACTOR, or the safety or convenience of the public, or the operation or maintenance of any other part of the Site.
- D. Unless otherwise required by law or by the Bidding Documents, each BIDDER shall keep confidential any and all communications, information, data, documents, and materials provided by or obtained from the GROUP, the GROUP’s REPRESENTATIVE, or the REMEDIAL DESIGNER, whether written or verbal,

unless already in the public domain or part of the public record of this Site or unless prior written permission to disclose same is obtained from the GROUP.

1.06 SUBMISSION OF BID PROPOSALS

- A. Bid Proposals shall be submitted not later than the time specified in Section 00020 of the Specifications, unless the time for the submission of Bid Proposals has been extended by means of a formal Addendum to the Bidding Documents. Addenda, if any, will be forwarded by any combination of electronic mail, facsimile transmission, U.S. Mail, or by express mail service.
- B. Bid proposals shall be submitted in compliance with the requirements of this Section.

1.07 SUBCONTRACTORS, SUPPLIERS, VENDORS, AND OTHERS

- A. CONTRACTOR agrees to bind specifically every SUBCONTRACTOR, supplier, vendor or other entity to the applicable terms and conditions of the Contract Documents for the benefit of the GROUP.
- B. CONTRACTOR shall be fully responsible for all acts and omissions of its SUBCONTRACTORS, suppliers, vendors, and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that it is responsible for the acts and omissions of persons directly employed by them.
- C. BIDDERS are specifically advised that any person, firm, or other party to whom it is proposed to award a Subcontract under this Agreement must be acceptable to the GROUP and that approval of the proposed Subcontract award cannot be given by the GROUP unless and until the Successful BIDDER submits all information and evidence to the GROUP regarding the proposed SUBCONTRACTOR, as is required in the General Conditions and elsewhere in the Contract Documents.

1.08 WITHDRAWAL OF BID PROPOSALS

- A. Any Bid Proposal may be withdrawn by BIDDER, prior to the scheduled time for receipt of Bids or authorized postponement thereof, provided BIDDER's written request for withdrawal is delivered to the GROUP before the deadline for the submission of proposals.
- B. No BIDDER may withdraw its proposal after that time except with the consent of the GROUP.

1.09 CHANGES TO BIDDING DOCUMENTS

- A. BIDDERS shall submit Bid Proposals in accordance with the Bid Documents. However, BIDDERS may make any explanations they wish by memorandum attached to the Bid Proposal, or by attached letter.
- B. Any proposed modifications to the Agreement shall be submitted with the Bid Proposal.
- C. BIDDERS shall not make any changes to the Specifications including alterations, erasures, or additions to the typewritten matter.
- D. No approval will be given for any “or equal” materials, equipment or systems, prior to the award of the Contract.

1.10 AWARD OF CONTRACT

- A. A written Notice of Award (NOA) will be mailed, transmitted by facsimile, or delivered by the GROUP to the successful BIDDER. At this time, the successful BIDDER, within fourteen (14) consecutive calendar days after issuance of a NOA shall sign the Agreement for the Work.
- B. Five (5) original hard copies of the signed and dated Agreement, Performance and Payment Bonds, Certificates of Insurance, and certified copies of insurance policies shall be submitted to the GROUP.
- C. All insurance and bonds offered in compliance with these Contract Documents shall be written by a surety company authorized, and who shall be an admitted carrier, in the State of New Jersey. Failure to comply with this requirement shall be grounds for disqualification of the BIDDER.
- D. The GROUP shall not incur any obligation as a result of any work performed by any CONTRACTOR or Bidding CONTRACTOR, prior to execution of a written Agreement and issuance of Notice to Proceed (NTP) by the GROUP.

1.11 QUALIFICATIONS OF BIDDERS

- A. The GROUP may make such investigation and inquiry as it deems necessary to determine the ability of BIDDERS to perform the Work, and BIDDERS shall furnish to the GROUP all such information and data for this purpose, as the GROUP may request. The GROUP has no obligation to reveal any investigation, nor the results thereof.
- B. The GROUP reserves the right, at its discretion/option, to reject any Bid Proposal, if the evidence submitted by or through investigation of such BIDDER fails to satisfy the GROUP in that said BIDDER is qualified to carry out the obligations of the Agreement and complete the Work specified in the Contract Documents or has previously failed to perform or complete any Contract on-time.

- C. Conditional Bid Proposals will not be accepted without prior approval/acceptance by the GROUP.

1.12 RIGHT TO REJECT BID PROPOSALS

- A. The GROUP reserves the right to reject Bid Proposals that contain irregularities and to reject Bid Proposals of BIDDERS who are not responsive or responsible. The GROUP reserves the right to waive minor irregularities in proposals at its sole discretion.
- B. The GROUP reserves the right to reject any Bids for any reason including that, in the opinion of the GROUP's REPRESENTATIVE, the Bid is unbalanced.
- C. The GROUP reserves the right, at its discretion/option, to cancel or postpone the Work or to re-solicit bids at any time.
- D. Any proposals submitted or received after the scheduled closing time, as stipulated in Section 00020 of the Specifications, for the receipt of proposals may be rejected and returned at GROUP's option.

1.13 REQUIREMENT OF BONDS

- A. Prior to, or upon the signing of the Agreement, CONTRACTOR shall furnish to the GROUP Performance and Payment Bond, in accordance with the Contract Documents.

1.14 INSURANCE

- A. CONTRACTOR shall maintain in force, during entire duration and performance of the Work, all insurance policies as required by the Contract Documents.
- B. Original policies, or properly executed conformed copies, evidencing the fact that CONTRACTOR has procured the required insurance shall be filed with the GROUP at the time of the execution of the Agreement along with Certificates of Insurance. As described in the Contract Documents, certified copies of policies are also required. Submission solely by Certificates of Insurance will not fulfill this requirement.

1.15 FAILURE TO EXECUTE CONTRACT

- A. If the Successful BIDDER fails to furnish the required performance/payment bonds or insurance policies or to execute the Agreement in accordance with instructions contained in the Notice of Award, it shall be deemed to have refused to enter into the Agreement and to have waived all claim(s) to the Work, and it shall pay the GROUP all damages sustained by the GROUP, as a consequence of its failure to enter into the Agreement, including all loss from delay and interference with the

GROUP's construction program and the difference between the amount of the Successful BIDDER's proposal and the amount for which the GROUP may Contract with another CONTRACTOR to perform the Work covered by said Bid Proposal, if the latter is in excess of the former. The surety on the Performance bond shall be liable for such damages to the extent of the principal amount of the Performance bond.

1.16 CORRECTIONS, ERRORS, ADDENDA, AND INTERPRETATIONS

- A. Corrections by erasures or other changes to the Bid Forms shall be explained or noted over the signature of BIDDER.
- B. If any BIDDER finds any omissions, discrepancies, ambiguities, inconsistencies, or errors in the Bidding Documents, it shall immediately notify the GROUP's REPRESENTATIVE, who may modify the documents accordingly. If Bidder fails to notify the GROUP's REPRESENTATIVE, it will be held to the GROUP's REPRESENTATIVE's interpretation of the Contract Drawings and Specifications, after the Agreement is executed. The GROUP's REPRESENTATIVE will notify all BIDDERS, by Addendum, of any modifications to the Contract Documents, prior to the time for acceptance of Bid Proposals.
- C. No BIDDER shall rely upon any interpretation of the meaning of the Contract Drawings, Specifications, or other Bidding Documents, except as provided herein. Every request for an interpretation of the Contract Documents shall be in writing, by electronic mail, U.S. mail, facsimile transmission, express service, or other form of delivery acceptable to the GROUP's REPRESENTATIVE, addressed to the GROUP's REPRESENTATIVE, and shall be received prior to the deadline indicated in Section 00020 of the Specifications. Any and all such interpretations and any supplemental instructions will be in written Addenda to the Bidding Documents and will be sent by facsimile transmission, electronic mail, U.S. Mail, or express mail service to all prospective BIDDERS (at the respective addresses furnished for such purposes) prior to the date fixed for the opening of bids. It shall be BIDDER's responsibility to contact the GROUP's REPRESENTATIVE to verify receipt of all Addenda issued.
- D. Failure of any BIDDER to receive any Addendum shall not relieve the BIDDER from any obligations under its Bid Proposal, as submitted. All Addenda shall become part of the final Contract Documents and Agreement.

1.17 CONDITIONS OF WORK

- A. Each BIDDER shall inform itself fully of the conditions relating to the construction and labor under which the Work will be performed; failure to do so will not relieve the Successful BIDDER of its obligation to furnish all material, labor, equipment, tools, fuels, taxes, fees, insurance, supplies, and incidentals necessary to carry out the provisions of the Contract Documents and to complete the contemplated Work for the consideration set forth in its Bid proposal.

- B. Each BIDDER, in bidding, represents that it relies exclusively upon its own investigations and it makes its Bid Proposal with a full knowledge of conditions, and the kind, quality, and quantity of Work to be performed.
- C. The quantities given in the Bidding Documents represent approximate values, and are given as a basis for the uniform comparison of the submitted Bid Proposals, and the GROUP does not expressly or by implication agree that the actual amount of Work will correspond therewith.
- D. Each BIDDER shall provide, for each item of Lump Sum Price Work, a proposed Contract price determined on the basis of the description provided for each Lump Sum item. Each Lump Sum price shall be deemed to include an amount for overhead, profit, and indirect costs for each Lump Sum item.
- E. Each BIDDER shall provide, for Unit Price Work, a proposed Contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed, and are solely for the purpose of comparing the submitted Bid Proposals. Each such unit price shall be deemed to include an amount for overhead, profit, and indirect costs for each separately defined item.
- F. An increase or decrease in the quantity for any unit price item shall not be regarded as sufficient grounds for an increase or decrease in the price of said item, nor in the time allowed for the completion of the Work, except as provided in the Contract Documents.
- G. It shall be the responsibility of the BIDDER to visit the Site of the proposed Work prior to the date for submission of its Bid Proposal, and to appraise the accuracy of the GROUP's quantity estimates and the actual conditions and requirements under which the Work specified in the Contract is to be performed.
- H. BIDDER shall not, at any time after the submission of a Bid Proposal, dispute such statement or quantity estimates of the GROUP, nor assert that there has been any misunderstanding in regard to the nature or amount of the Work to be done.

1.18 CONTRACT TIME

- A. The dates by which the Work is to be completed and ready for final inspection and payment (the Contract Time) are as set forth in the Contract Documents.

1.19 LIQUIDATED DAMAGES

- A. Provisions for liquidated damages are set forth in Section 00800 of the Specifications.

1.20 INTENT OF BIDDING DOCUMENTS

- A. The Contract Drawings, Specifications, all Addenda, and the Agreement are all part of the Contract Documents. See Section 00600 of Specifications for a detailed listing of those documents incorporated into the Contract Documents.
- B. The intent of the Bidding Documents is to obtain a complete, operable, and efficient job. It shall be understood that the BIDDER has satisfied itself as to the full requirements of the Bidding Documents and has based its Bid Proposal upon such understanding.

1.21 COMPLIANCE WITH LAWS

- A. The BIDDER's attention is directed to the fact that all applicable laws, rules, regulations, and codes, including municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project, including those applicable and relevant under the Consent Decree, entered on September 30, 2004 with regard to the Site, and the Record of Decision, dated August 12, 2002, shall apply to the Agreement throughout and that they will be deemed to be included in the Agreement, as though herein written out in full.
- B. Corporate BIDDERS shall submit a duly executed and attested resolution, marked with the corporate seal, indicating that the Bid was authorized by the corporation.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

***** END OF SECTION *****

SECTION 00300

BID FORMS

SUBMIT BID PROPOSALS TO:

216 Paterson Plank Road Cooperating PRP Group
c/o Golder Associates Inc.
The National Newark Building
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102

Attn: Mr. P. Stephen Finn, C.Eng.
Project Coordinator

**Re: 216 PATERSON PLANK ROAD SUPERFUND SITE
OPERABLE UNIT NO. 2 (OU-2) FINAL REMEDY
CARLSTADT, BERGEN COUNTY, NEW JERSEY**

Ladies and Gentlemen:

- 1) The undersigned BIDDER proposes and agrees to enter into an Agreement with the 216 Paterson Plank Road Cooperating PRP Group (“the GROUP”), in the form included in Section 00600 of the Specifications, to perform, furnish, and complete all Work specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid Proposal.
- 2) BIDDER accepts all of the terms, conditions, covenants, and provisions presented in the Contract Documents.
- 3) BIDDER agrees to deliver three (3) copies of this Bid Proposal, including all documents required by the Bidding Requirements and bearing original signatures of the duly designated individual with authority to execute this Agreement.
- 4) In submitting this Bid Proposal, BIDDER represents, as set forth in the Agreement, that:
 - a) BIDDER has carefully examined and studied all identified Contract Documents, and hereby acknowledges receipt of the following Addenda to the Contract Documents:
 - Addendum No. 1, dated September 24, 2007;
 - Addendum No. 2, dated September 26, 2007;
 - Addendum No. 3, dated October 4, 2007;
 - Addendum No. 4, dated October 8, 2007;
 - Addendum No. 5, dated January 18, 2008; and
 - Addendum No. 6, dated February 1, 2008.
 - b) BIDDER has visited the Site and become familiar with and is satisfied as to the existing Site conditions and constraints, which may affect BIDDER’s sequences and methods of

- construction, costs, progress, duration, and performance of the Work, as specified in the Contract Documents;
- c) BIDDER is familiar with and is satisfied as to all federal, state, and local laws, rules, and regulations, which may affect BIDDER's sequences and methods of construction, costs, progress, duration, and performance of the Work, as specified in the Contract Documents;
 - d) BIDDER has obtained and review copies of the Record of Decision (ROD) and Consent Decree (CD) for the subject Site and project;
 - e) BIDDER has carefully studied all available investigative, feasibility study, and design reports, drawings, figures, information, and data, as listed in Section 00200 of the Specifications, it deemed necessary and relevant to its preparation of the Bid Proposal. BIDDER acknowledges that such reports, drawings, figures, information, and data are not part of the Contract Documents, and may not be complete for BIDDER's purposes;
 - f) BIDDER acknowledges that the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER do not assume responsibility for the accuracy and/or completeness of information and data presented, shown, or indicated in the Bidding Documents with respect to subsurface conditions and/or Underground Facilities (e.g., buried utilities) at or contiguous to the Site;
 - g) BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site, which may affect BIDDER's planned sequences and methods of construction, costs, progress, duration, safety precautions, and performance of the Work, as specified in the Contract Documents;
 - h) BIDDER does not believe and agrees that no additional examinations, investigations, explorations, tests, studies, or data concerning conditions, at or contiguous to the Site, are necessary for its preparation of this Bid Proposal to perform, furnish, and complete all Work specified or indicated in the Contract Documents;
 - i) BIDDER recognizes and understands what the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER's authority is in connection to the subject remedial construction project, as stipulated in this Agreement, and agrees to work cooperatively and collaboratively with the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER to successfully complete the Work within the specified Contract Time;
 - j) BIDDER agrees to implement its best efforts to complete the Work, as defined by the Contract Documents, within two-hundred-eighty (280) consecutive calendar days following the commencement date stipulated in the GROUP's "Notice to Proceed" to BIDDER, and understands it will not be subject to liquidated damages or declared in default, if BIDDER is unable to complete such work within this period, provided such inability is not due to BIDDER's default or inability to complete the Work, as specified in the Contract Documents;

- k) BIDDER has given the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER written notice of all conflicts, errors, ambiguities, inconsistencies, or discrepancies that BIDDER discovered, during the Bid Proposal preparation period, in the Contract Documents. BIDDER also acknowledges that written resolution thereof by either the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER has been received by BIDDER, is acceptable to BIDDER, and the Contract Documents are sufficient to indicate and convey understanding of all terms, conditions, covenants, provision, and requirements of the Contract documents;
 - l) This Bid Proposal is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation, and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;
 - m) BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or deceptive Bid Proposal, under false or fraudulent pretences;
 - n) BIDDER has not solicited or induced any person, firm, or corporation to refrain from bidding; and
 - o) BIDDER has not sought, by collusion, to obtain for itself any advantage over any other BIDDER or over the GROUP.
- 5) Per the Instruction to Bidders, BIDDER has completed both the "*Base Bid*" and "*Alternate Bid - A*" cost summary tables (see Exhibits "A" and "B", respectively, attached to these Bid Forms) to complete the Work, as specified in the Contract Documents. BIDDER acknowledges that any decision by the GROUP to implement any additional items identified in "*Alternate Bid - A*" will not be made until after completion of the specified In-situ "Hot Spot" Treatment field verification program. If the GROUP is not required to implement "*Alternate Bid - A*", BIDDER will not be entitled to any compensation under "*Alternate Bid - A*", and will be required to complete the Work specified in the Contract Documents in accordance with the prices/costs presented in BIDDER's "*Base Bid*".
- 6) The following documents are attached to and made conditions to (i.e., fully part of) this Bid Proposal:
- a) BIDDER shall provide a detailed listing of all SUBCONTRACTORS, suppliers, vendors, and other individuals and entities that BIDDER envisions or intends to enter into separate Subcontract agreements to perform any portions the Work or to provide materials, products, or equipment, as specified by the Contract Documents (see Exhibit "C" to these Bid Forms). BIDDER shall also provide the anticipated, estimated value for all portions of the Work intended to be performed by SUBCONTRACTORS;
 - b) BIDDER shall provide a Baseline Construction Progress Schedule (see Exhibit "D" to these Bid Forms), which indicates that the Work will be completed within the specified Contract Time, and this schedule shall detail BIDDER's propose, planned sequences of construction;
 - c) BIDDER shall provide a tabulation of "*time and material*" direct rates for any construction equipment and/or personnel used to prepare this Bid Proposal (see Exhibit

“E” attached to these Bid Forms), which would be used to evaluate this Bid Proposal and form the basis for any additional work not covered by the prices/costs presented in BIDDER’s “Base Bid” and “Alternate Bid - A” cost summary tables, as attached to these Bid Forms. This additional Work may be performed at unit rates negotiated with and approved by the GROUP or on a “time and materials” basis using the unit price list BIDDER included with this Bid Proposal. Bidder will include all costs for the associated operators and maintenance in its proposed unit rates for any and all construction equipment; and

- d) BIDDER shall provide a detailed listing of all Bid Proposal assumptions (See Exhibit “F” to these Bid Forms).
- 7) BIDDER will complete the Work, as specified in the Contract Documents, for the prices/costs presented and attached to these Bid Forms, unless modified in accordance with the terms, conditions, covenants, and provisions incorporated into the Agreement and approved by the GROUP.
- 8) BIDDER accepts the provisions of this Agreement related to “liquidated damages”, in event of failure, by BIDDER, to complete the Work within the specified Contract Time.
- 9) All communication concerning this Bid Proposal shall be forwarded to:

Golder Associates, Inc.
Attn: Mr. Mark F. McNeilly, P.E.
744 Broad Street, 25th Floor, Suite 2500
Newark, New Jersey 07102
Phone: (973) 621-0777
Fax: (973) 621-7725
Email: mmcneilly@golder.com
- 10) BIDDER acknowledges that the terms, conditions, covenants, provisions, and requirement incorporated into this Bid Proposal, which are defined in the Contract Documents, have the same meanings indicated in the Contract Documents.

Revision 2

Declarations:

IN WITNESS WHEREOF, BIDDER hereby signs, seals, and delivers three (3) hard copies and one (1) electronic (i.e., PDF file format) of this Bid Proposal for consideration by the GROUP.

SIGNED, sealed, and delivered this _____ day of _____, 2008.

By: _____

Name: _____

Title: _____

Date: _____

(Provide evidence of authority to sign this Bid Proposal. See attached)

CONTRACTOR's New Jersey License No. _____.

SUBSCRIBED AND SWORN TO BEFORE ME, the undersigned notary, by
_____ this _____ day of _____, 2008.

Notary Public for State of _____

Printed Name of Notary: _____

My Commission Expires: _____

Revision 2

If BIDDER is:

An Individual:

Name (typed/printed): _____
(SEAL)

By: _____
(Signature of Individual)

Doing business as: _____

Business Address: _____

Phone Number: _____

Facsimile Number: _____

Email Address: _____

Revision 2

If BIDDER is:

A Partnership:

Partnership Name: _____
(SEAL)

Name (typed/printed): _____

By: _____
(Signature of general partner)
(Attach evidence of authority to sign)

Business Address: _____

Phone Number: _____

Facsimile Number: _____

Email Address: _____

Revision 2

If BIDDER is:

A Corporation:

Corporation Name: _____
(CORPORATE SEAL)

State of Incorporation: _____

Type of Corporation: _____
(General Business, Professional, Services, Limited Liability)

By: _____
(Signature of authorized agent of corporation)
(Attach evidence of authority to sign)

Name (typed/printed): _____

Title: _____

Attest: _____
(Signature of Corporate Secretary)

Date of Qualification
To do business is: _____

Business Address: _____

Phone Number: _____

Facsimile Number: _____

Email Address: _____

Revision 2

If BIDDER is:

A Joint Venture:

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of Joint Venturer's authorized agent)
(Attach evidence of authority to sign)

Name: _____

Title: _____

Business Address: _____

Phone Number: _____

Fax Number: _____

Email Address: _____

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of Joint Venturer's authorized agent)
(Attach evidence of authority to sign)

Name: _____

Title: _____

Business Address: _____

Phone Number: _____

Fax Number: _____

Email Address: _____

Phone and Facsimile and Address for receipt of official communications:

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture shall be in the manner indicated above.)

EXHIBIT "A"
COST SUMMARY TABLE FOR "BASE BID"

| Item No. | Description | Estimated Quantity | Unit | Unit Price | Extended Price |
|----------------------------------|--|--------------------|------|------------|----------------|
| 1 | Mobilization/Demobilization | 1 | LS | \$ | \$ |
| 2 | Surveying and Field Engineering | 1 | LS | \$ | \$ |
| 3 | Performance Bond | 1 | LS | \$ | \$ |
| 4 | Payment Bond | 1 | LS | \$ | \$ |
| 5 | Health and Safety & Air Monitoring | 1 | LS | \$ | \$ |
| 6 | Soil Erosion and Sediment Control | 1 | LS | \$ | \$ |
| 7 | Clearing and Grubbing | 1 | LS | \$ | \$ |
| 8 | Remove Existing Geomembrane and Subgrade Preparation | 1 | LS | \$ | \$ |
| 9 | Place Grading Fill | 2,000 | CY | \$ | \$ |
| 10 | Install Geosynthetic Clay Liner | 28,000 | SY | \$ | \$ |
| 11 | Install New Geomembrane | 28,500 | SY | \$ | \$ |
| 12 | Install Geocomposite Drainage Layer | 27,500 | SY | \$ | \$ |
| 13 | Place Cover Soil | 27,000 | SY | \$ | \$ |
| 14 | Place Vegetative Support Layer | 26,000 | SY | \$ | \$ |
| 15 ^d | In-Situ "Hot Spot" Treatment Field Verification Program (FVP) | 10 | DAY | \$ | \$ |
| 15-A | In-Situ "Hot Spot" Treatment Post-FVP Stand-by Time | 20 | DAY | \$ | \$ |
| 16 | In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations | 37 | DAY | \$ | \$ |
| 17 | Install New Sheet Pile Wall | 25,000 | SF | \$ | \$ |
| 18 | Construct Perimeter Access Roads | 1 | LS | \$ | \$ |
| 19 | Place Stone Aggregate and Rip Rap | 1,000 | CY | \$ | \$ |
| 20 | Install 12-in-dia Road Culvert | 35 | LF | \$ | \$ |
| 21 | Demolition | 1 | LS | \$ | \$ |
| 22 | Well Decommissioning | 19 | EA | \$ | \$ |
| 23 | Install New Perimeter Chain Link Fence | 1,000 | LF | \$ | \$ |
| 24 | Install Pre-Engineered Metal Building | 1 | LS | \$ | \$ |
| 25 | Install New Groundwater Recovery Wells | 10 | EA | \$ | \$ |
| 26 | Install Groundwater Recovery System Carrier Pipes | 3,500 | LF | \$ | \$ |
| 27 | Install New Piezometers | 19 | EA | \$ | \$ |
| 28 | Install Non-Woven Geotextiles | 3,500 | SY | \$ | \$ |
| 29 | In-Situ "Hot Spot" Treatment VOC Off-Gas Activated Carbon Usage | 1,750,000 | LBS | \$ | \$ |
| 29-A | In-Situ "Hot Spot" Treatment VOC Off-Gas Collection, Treatment, and Discharge System | 47 | DAY | \$ | \$ |
| 30 | Management and Disposal of Surface/Decon Water | 30,000 | GAL | \$ | \$ |
| 31 | Management and Disposal of Groundwater | 20,000 | GAL | \$ | \$ |
| TOTAL CONSTRUCTION COST = | | | | | \$ |

- (a) Prices shall be computed in accordance with Section 01025 of the Specifications.
- (b) BIDDER acknowledges that the quantities presented herein are not guaranteed, and payment will be based on actual installed/completed quantities, as determined and provided for in the Contract Documents.
- (c) CONTRACTOR shall undertake and complete the specified In-Situ "Hot Spot" Treatment Field Verification Program to the GROUP's satisfaction, and CONTRACTOR shall implement all reasonable, feasible efforts, it and/or the REMEDIAL DESIGNER deem necessary, to achieve the specified performance criteria.
- (d) Abbreviated units are as follows:

| | | |
|---------------|------------------|------------------|
| LS = Lump Sum | CY = Cubic Yard | SY = Square Yard |
| EA = Each | LF = Linear Feet | SF = Square Feet |
| GAL = Gallon | LBS = Pounds | DAY = Work Day |

EXHIBIT “B”

COST SUMMARY TABLE FOR “ALTERNATE BID - A”

| Item No. | Description | Estimated Quantity | Unit | Unit Price | Extended Price |
|----------|--|--------------------|------|------------|----------------|
| 16-A | In-Situ “Hot Spot” Treatment Excavation, Off-Site Disposal, and Backfill of Treated Mass | 5,063 | TON | \$ | \$ |

Notes:

- (a) This “Alternate Bid - A” may be invoked at the GROUP discretion, but ONLY after the In-Situ “Hot Spot” Treatment field verification program, which is covered under Bid Item No. 15 in the “Base Bid”, has been completed, and the results and findings of this field verification program have been evaluated.
- (b) CONTRACTOR shall undertake and complete the specified In-Situ “Hot Spot” Treatment Field Verification Program (“Base Bid” Bid Item No. 15) to the GROUP’s satisfaction, and CONTRACTOR shall implement all reasonable, feasible efforts, it and/or the REMEDIAL DESIGNER deem necessary, to achieve the specified performance criteria.
- (c) If the GROUP elects to invoke this “Alternate Bid - A”, CONTRACTOR shall implement its In-Situ “Hot Spot” Treatment Production Operations (under Bid Item No. 16), and then excavate and dispose of the treated mass of material off-Site at an approved/authorized disposal facility.
- (d) Prices shall be computed in accordance with Section 01025 of the Specifications.
- (e) BIDDER acknowledges that the quantities presented herein are not guaranteed, and payment will be based on actual installed/completed quantities, as determined and provided for in the Contract Documents.
- (f) Abbreviated units are as follows:

| | | |
|------------------------------|------------------|------------------|
| LS = Lump Sum | CY = Cubic Yard | SY = Square Yard |
| EA = Each | LF = Linear Feet | SF = Square Feet |
| GAL = Gallon | LBS = Pounds | DAY = Work Day |
| TON = Tons (i.e., 2,000 LBS) | | |

Revision 2

EXHIBIT "C"

SUBCONTRACTOR LIST

PROJECT: 216 Paterson Plank Road Operable Unit No. 2 (OU-2) Final Remedy

CONTRACTOR: _____

SUBCONTRACTORS:

(1) Name: _____

Address: _____

Telephone: _____ Fax: _____ Email: _____

Contact Person: _____

Type of Work: _____

Percentage of Total Contract: _____

(2) Name: _____

Address: _____

Telephone: _____ Fax: _____ Email: _____

Contact Person: _____

Type of Work: _____

Percentage of Total Contract: _____

(3) Name: _____

Address: _____

Telephone: _____ Fax: _____ Email: _____

Contact Person: _____

Type of Work: _____

Percentage of Total Contract: _____

(4) Name: _____

Address: _____

Telephone: _____ Fax: _____ Email: _____

Contact Person: _____

Type of Work: _____

Percentage of Total Contract: _____

(5) Name: _____

Address: _____

Telephone: _____ Fax: _____ Email: _____

Contact Person: _____

Type of Work: _____

Percentage of Total Contract: _____

February 2008
943-6222

216 Paterson Plank Road Site
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Revision 2

EXHIBIT “D”

BASELINE CONSTRUCTION PROGRESS SCHEDULE

(To be attached by BIDDER/CONTRACTOR)

February 2008
943-6222

216 Paterson Plank Road Site
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Revision 2

EXHIBIT "F"

BID PROPOSAL ASSUMPTIONS

(To be attached by BIDDER/CONTRACTOR)

SECTION 00700

GENERAL CONDITIONS

These General Conditions, as listed below, amend or supplement the terms, conditions, covenants, requirements, and other provisions stipulated in the executed Construction Agreement. All terms, conditions, covenants, requirements, and provisions, which are not so amended or supplemented, shall remain in full force and effect.

GC-1. DEFINITIONS

- A. See Section 01015 of the Specifications for meanings and definitions of various common terms used throughout and incorporated into the Contract Documents.

GC-2. OWNERSHIP AND USE OF CONTRACT DOCUMENTS

- A. CONTRACTOR shall be furnished five (5) complete copies of the Contract Documents. Additional copies shall be furnished upon request, and at the cost of reproduction.
- B. CONTRACTOR shall have no ownership rights in any of the Contract Documents, including the Contract Drawings and Specifications.
- C. By executing this Contract, CONTRACTOR represents that it has: a) examined the Contract Documents thoroughly; b) visited the Site to become familiar with local conditions that may in any manner affect cost, progress, or performance of the Work; c) become familiar with all federal, state and local laws, ordinances, rules regulations that may in any manner affect cost, progress, or performance of the Work; and d) studied and carefully correlated CONTRACTOR's observations with the Contract Documents.
- D. The Contract Documents comprise the entire Contract between the GROUP and CONTRACTOR concerning the Work. The Contract Documents are complimentary, and what is required by one is as binding as if requested by all.
- E. It is the intent of the Contract Documents to describe a functionally complete Project, or part thereof, to be constructed. Any work, materials, products, or equipment that may reasonably be inferred from the Contract Documents, as being required to produce the intended result, shall be supplied whether or not specified. When words that have a well-known technical or trade meaning are used to describe the Work, materials, products, or equipment, such words shall be interpreted in accordance with that meaning. References to standard specifications, manuals, or codes of any technical society, organization, or association or to the laws or regulations of any governmental authority shall mean the latest standard specification, manual, code, laws, or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated.

- F. The GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall issue such written clarifications and interpretations of the requirements of the Contract Documents, as may be deemed necessary. Such clarifications and interpretations shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.
- G. If, during the performance of the Work, CONTRACTOR finds any conflicts, errors, or discrepancies in the Contract Documents, CONTRACTOR shall immediately report said conflicts, errors, and/or discrepancies to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER in writing. Before proceeding with the Work affected thereby, CONTRACTOR shall obtain a written interpretation or clarification from the REMEDIAL DESIGNER. Any work done before the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER render their decisions is at the CONTRACTOR's sole risk.
- H. If specific means, methods, technique, sequences, or procedures of construction are indicated in or required by the Contract Documents, CONTRACTOR may use a substitute means, methods, sequence, technique, or procedure of construction acceptable to the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, provided CONTRACTOR submits sufficient information to allow the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents, and said substitute proposed is consistent with the remedy described in the Record of Decision.
- I. The GROUP's REPRESENTATIVE shall be allowed a reasonable time, but not less than seven (7) days, to consult with the REMEDIAL DESIGNER to evaluate each proposed substitute. The GROUP's REPRESENTATIVE shall be the final judge of acceptability and no substitute shall be ordered, installed, or used without the GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's prior written acceptance, which shall be evidenced by either a change order or other appropriate documentation. CONTRACTOR may be required to furnish, at the CONTRACTOR's expense, a special performance guarantee or other surety with respect to any substitute.
- J. The GROUP's REPRESENTATIVE shall record the time required by the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the GROUP's REPRESENTATIVE accepts a proposed substitute, CONTRACTOR shall reimburse the GROUP's REPRESENTATIVE for the charges of the GROUP's REPRESENTATIVE, REMEDIAL DESIGNER, and REMEDIAL DESIGNER's consultants for evaluating each proposed substitute.
- K. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed", "as approved", or terms of like effect or import are used or the adjectives "reasonable," "suitable", "acceptable," "proper", or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the GROUP's REPRESENTATIVE and REMEDIAL

DESIGNER as to the Work, it is intended that such requirement, direction, review or judgment shall be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective shall not relieve the CONTRACTOR of its duty and responsibility to supervise or direct the furnishing or performance of the Work.

- L. CONTRACTOR may reproduce and distribute to its employees, SUBCONTRACTORS, vendors, and suppliers all Contract Drawings, Specifications, and data necessary to execute the Work. CONTRACTOR shall assure all of its employees and its SUBCONTRACTORS, vendors, and suppliers work only from the latest revision of issued-for-construction Contract Documents, including Contract Drawings and Specifications. CONTRACTOR shall maintain and make available to the GROUP's REPRESENTATIVE an up-to-date file of all Contract Documents, including all Contract Drawings and Specifications.

GC-3. SUPERVISION AND CONSTRUCTION PROCEDURES

- A. CONTRACTOR and its SUBCONTRACTORS shall not be allowed to perform any Work on-Site without the full-time, on-Site presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL ENGINEER.
- B. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. CONTRACTOR shall be responsible to see that the completed work complies with the Contract Document.
- C. The CONTRACTOR shall be solely responsible for the acts and omissions of the CONTRACTOR's employees, SUBCONTRACTORS, vendors, suppliers, and their representatives, agents, and employees, and other persons performing any of the Work.
- D. CONTRACTOR shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the GROUP, the GROUP's REPRESENTATIVE, or the REMEDIAL DESIGNER by inspections, tests, favorable reviews, or the lack thereof, required or performed by persons other than CONTRACTOR.
- E. CONTRACTOR shall designate in writing a competent full-time resident superintendent, satisfactory to the GROUP and the REMEDIAL DESIGNER, to supervise and direct the Work, and this superintendent shall be on-Site at all times during working hours with full authority to act on behalf of CONTRACTOR. CONTRACTOR shall also provide an adequate staff for the proper coordination and expediting of its work. Should, in the opinion of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, any language barrier exist between the superintendent and the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, CONTRACTOR will, at its own expense, employ a qualified interpreter.

- F. CONTRACTOR's designated superintendent shall not be replaced without advance written notice to and approved by the GROUP's REPRESENTATIVE. CONTRACTOR shall provide a management chart and a list of personnel comprising the superintending staff and their areas of responsibility. All written communications given to the superintendent or the superintending staff shall be as binding as if given to the CONTRACTOR.
- G. The superintendent shall remain on-Site not less than eight (8) hours-per-day, five (5) days-per-week until termination of the Contract in accordance with the Contract Documents, unless the Work is suspended or stopped by the GROUP or the GROUP's REPRESENTATIVE. The superintendent shall not be employed or used on any other project during the course of the Work.
- H. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction, as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons, work, or property at the Site or adjacent thereto and except as otherwise indicated in the Contract Documents, all Work at the Site shall be performed during regular working hours and the CONTRACTOR shall not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without the GROUP's REPRESENTATIVE's written consent given after at least forty-eight (48) hours prior written notice.
- I. CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment, and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, startup and completion of the Work.
- J. All work shall be performed in a skillful, professional, and workmanlike manner.
- K. CONTRACTOR shall at all times enforce strict discipline and good order among the CONTRACTOR's employees and shall not employ any unfit person or anyone not skilled in the task assigned to him/her. The GROUP's REPRESENTATIVE may, in writing, require CONTRACTOR to remove from the Project any employee it deems incompetent, careless, or otherwise objectionable.

GC-4. SUBCONTRACTS

- A. Unless specifically permitted otherwise, CONTRACTOR shall perform with its own organization and with the assistance of workmen under its immediate superintendence Work amounting to not less than fifty-one-percent (51%) of the total Contract value.
- B. CONTRACTOR shall not employ any SUBCONTRACTOR, supplier, vendor, or other person(s) or organization(s) against whom the GROUP and/or the GROUP's REPRESENTATIVE may have reasonable objection. CONTRACTOR shall not be required to employ any SUBCONTRACTOR, supplier, vendor, or other person(s) or organization(s) to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

- C. CONTRACTOR shall not execute an agreement with any SUBCONTRACTOR, vendors, and/or suppliers or permit any SUBCONTRACTORS, vendors, or suppliers to perform any work included in this Contract until the GROUP has approved said SUBCONTRACTOR in writing.
- D. When the Contract Documents require the identity of certain SUBCONTRACTORS, suppliers or other persons or organizations, including those who are to furnish the principal items of materials, products, and equipment, to be submitted for acceptance to the GROUP's REPRESENTATIVE prior to the effective date of the Contract and if the CONTRACTOR has submitted a list thereof in accordance with the Contract Documents, the GROUP's REPRESENTATIVE's acceptance, in writing, of any such SUBCONTRACTORS, supplier, vendors, or other persons or organizations so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. No acceptance by the GROUP of any such SUBCONTRACTOR, supplier, vendor, or other person or organization shall constitute a waiver of any right of the GROUP to reject defective Work.
- E. CONTRACTOR shall be fully and solely responsible to the GROUP for all acts, errors, and omissions of the SUBCONTRACTORS, suppliers, vendors, and other persons and organizations performing or furnishing any portion of the Work under a Contract with CONTRACTOR, just as CONTRACTOR is responsible for the CONTRACTOR's own acts, errors, and omissions.
- F. All work performed for CONTRACTOR by a SUBCONTRACTOR shall be pursuant to an appropriate agreement between CONTRACTOR and the SUBCONTRACTOR that specifically binds SUBCONTRACTOR to the applicable terms and conditions of the Contract Documents. CONTRACTOR shall pay each SUBCONTRACTOR a just share of any insurance moneys received by the CONTRACTOR on account of losses under policies issued.
- G. Nothing contained in the Contract Documents is intended to create, nor shall it create, any contractual relationship between the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL ENGINEER, or any of their agents, employees, or representatives and any SUBCONTRACTOR.

GC-5. OTHER CONTRACTS

- A. The GROUP reserves the right to issue or enter into other Contracts in connection with this Work. CONTRACTOR shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and/or coordinate its work with theirs.
- B. The GROUP may award, or may have awarded other Contracts for additional work, and CONTRACTOR shall cooperate fully with such other Contractors, by scheduling its Work with that to be performed under other Contracts, as may be directed by the GROUP. CONTRACTOR shall not permit or commit any act, which will interfere with the performance of Work by any other Contractor, as scheduled.

- C. Wherever Work being done by other Contractors is contiguous to Work covered by this Contract, the respective rights of the various interests involved shall be established by the GROUP's REPRESENTATIVE to secure the completion of the various portions of the Work in general harmony.

GC-6. FITTING AND COORDINATION OF THE WORK

- A. CONTRACTOR shall be responsible for the proper fitting of all Work and for the coordination of the operations of all trades, SUBCONTRACTORS, vendors, suppliers, and labor forces engaged on this Contract. CONTRACTOR shall be prepared to guarantee to each of its SUBCONTRACTORS the locations and measurements, which they may require for the fitting of their Work to all surrounding Work.
- B. CONTRACTOR shall, at its own expense, effect all cutting, fitting, or patching of its work required to make the same conform to the Contract Drawings and Specifications, and except with the consent of the GROUP, not to cut or otherwise alter the Work of any other Contractor(s).

GC-7. RESPONSIBILITY OF CONTRACTOR

- A. If, through acts or neglect on the part of CONTRACTOR, any other Contractor or SUBCONTRACTOR suffers a loss or damage in connection with the Work, CONTRACTOR shall settle with such other Contractor or SUBCONTRACTOR by agreement or arbitration.
- B. If such other Contractor or SUBCONTRACTOR asserts any claim against the GROUP on account of any damage alleged to have been so sustained during performance of the Work, the GROUP will notify CONTRACTOR, who shall defend at its own expense any suit based upon such claim, and in any judgment or claims against the GROUP shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and will in all other respects, including, but not limited to, attorney's fees and court costs, hold harmless the GROUP and REMEDIAL DESIGNER.

GC-8. CONSTRUCTION PROGRESS SCHEDULES

- A. CONTRACTOR shall (unless a Pre-Award Construction Progress Schedule has been submitted and approved by the GROUP) prepare and submit within seven (7) calendar days following execution of this Agreement a realistic, detailed Construction Progress Schedule for review and approval by the GROUP, which shows the Contractors proposed sequence of construction and includes start/finish dates and durations for each and every planned construction activity, as specified by the Contract Documents.
- B. Construction Progress Schedules shall include (at a minimum):
 - 1) The project name, number, and geographic location;

- 2) The Contract time, commencement date, substantial and final completion date, and periods of shutdown, if any;
 - 3) Listings of all Work items with periods of activity for Work segment; and
 - 4) The total estimated Contract cost for each Work segment, and its percentage of the total Contract cost.
- C. *“Requests for Payment”* will not be processed or approved for payment until such time updated Construction Progress Schedules are submitted to and approved by the GROUP’s REPRESENTATIVE.
- D. CONTRACTOR shall reviewed or updated said Construction Progress Schedule on a bi-weekly basis (i.e., every 2 weeks), unless directed otherwise by the GROUP’s REPRESENTATIVE.
- E. See Section 01041 of the Specification for additional requirements relative to preparation of and submission of all Construction Progress Schedules.

GC-9. PAYMENTS

- A. CONTRACTOR shall submit *“Requests for Payment”* to the GROUP’s REPRESENTATIVE on a monthly basis. Formats and contents of each *“Request for Payment”* shall be established and mutually agreed to, prior to submission of CONTRACTOR’s initial *“Request for Payment”*.
- B. At a minimum, all *“requests for Payment”* shall include, but not be limited to, the following: a) full details, on an item by item basis, as to the Work completed with the requested payment period; b) estimates of the percentage completed for each item, both to date and during the month; and c) amounts invoiced, item by item and totaled, both to date and during the month.
- C. Within thirty (30) consecutive calendar days of receipt of each submitted *“Request for Payment”*, the GROUP’s REPRESENTATIVE will review the submitted *“Requests for Payment”*, and identify, discuss, and resolve all controversial items/issues, if any, with CONTRACTOR, as necessary. If there are no controversial issues/items or said controversial items/issues have be mutually resolved, the GROUP’s REPRESENTATIVE will approve said *“Requests for Payment”*, and issues said *“Requests for Payment”* to the GROUP for payment
- D. Upon approval of each *“Request for Payment”*, the GROUP will pay CONTRACTOR ninety-percent (90%) of the total value for each approved *“Request for Payment”*, and withhold ten-percent (10%) as retainage. The amount of retainage shall in no way limit CONTRACTOR’s liability under this Agreement.
- E. The GROUP shall hold such retainage percentages as security for the faithful performance, by CONTRACTOR, of all conditions, covenants, and requirements specified and provided for in this Contract Agreement. Furthermore, such retainage shall be payable to CONTRACTOR upon: a) the GROUP having received completed and signed Bills Paid Affidavits and Waiver of Liens forms by CONTRACTOR all SUBCONTRACTORS performing portions of the Work; and b) the latter of (i) thirty

(30) consecutive calendar days following Final Completion and (ii) delivery to the GROUP of all items required by this Contract.

- F. CONTRACTOR may petition the GROUP for an early release of partial or full retainage, under the condition that the Work is being conducted in accordance with the Contract Documents to the satisfaction of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. The GROUP shall review all CONTRACTOR requests for releases of retainage, and provide responses within fourteen (14) calendar days of receipt of CONTRACTOR's written requests.
- G. The GROUP may withhold or decline to pay CONTRACTOR, because of, but not limited to, any of the following reasons:
- 1) Costs of all defective, rejected, or incomplete Work;
 - 2) All damages, losses, or expenses incurred by the GROUP on account of defective, rejected, or incomplete Work or CONTRACTOR's performance of the Work;
 - 3) All claims, demands made, or liens filed by any person or entity against the GROUP, the Work or the Project Site on account of defective or incomplete Work, CONTRACTOR's performance of the Work or failure to pay Subcontractors, laborers, or Suppliers;
 - 4) Failure of CONTRACTOR to make payments to SUBCONTRACTORS, suppliers, and/or vendors;
 - 5) Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price;
 - 6) Damages to the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or other Contractors;
 - 7) Failure to comply with CONTRACTOR's approved Construction Progress Schedule; and
 - 8) Failure to perform the Work in accordance with the Contract documents;

When the circumstances resulting in non-payment to CONTRACTOR are removed to the satisfaction of the GROUP, payment shall be made for amounts withheld because of them.

- H. CONTRACTOR warrants and guarantees that title to all work, labor, materials, and equipment covered by any "*Request for Payment*", whether incorporated in the Project or not, shall pass to the GROUP free and clear of all liens no later than the time of payment.
- I. The GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER shall determine actual quantities and classifications of unit price work performed and documented by CONTRACTOR. The CONTRACTOR shall review the GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's preliminary determinations of such quantities. The GROUP's REPRESENTATIVE's determination thereof shall be final and binding upon CONTRACTOR unless, within five (5) days after the date of any such decision, CONTRACTOR delivers to the GROUP's REPRESENTATIVE written notice of its intention to appeal the determination.

- J. With each "*Request for Payment*", CONTRACTOR and each of its lower tier SUBCONTRACTORS, suppliers, and vendors seeking payment, must provide completed Bills Paid Affidavit and Waiver of Liens forms. See Section 00310 of the Specifications for the Bills Paid Affidavit and Waiver of Liens form.
- K. Receipt, by the GROUP's REPRESENTATIVE, of all completed Bills Paid Affidavit and Waiver of Liens form shall be a condition precedent to payment of any "*Requests for Payment*", and the thirty (30) day time period for payment will not commence until the GROUP has received said completed Bills Paid Affidavit and Waiver of Liens forms from all parties seeking payment under each "*Request for Payment*".

GC-10. CHANGES IN THE WORK

- A. The GROUP may make changes in the Work, as required to be performed by CONTRACTOR under this Contract, by making additions thereto, or by omitting Work therefrom, without invalidating the Contract.
- B. Except for the purpose of affording protection against any emergency endangering life or property, CONTRACTOR shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of this Contract, unless in pursuance of a written order from the GROUP authorizing CONTRACTOR to proceed with the change. No claim for an adjustment of the Contract price will be valid unless so ordered.
- C. CONTRACTOR agrees to perform any of the aforementioned changed work, along with all other required work found under the Contract, without delay and in accordance with good construction practices.
- D. The changes outlined above may be made without relieving or releasing CONTRACTOR from any of its obligations under the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is provided otherwise.
- E. If applicable unit prices are contained in the Agreement (established as a result of either a Unit Price Bid or a Supplemental Schedule of Unit Prices), the GROUP may order CONTRACTOR to proceed with desired changes in the work, the value of such change to be determined by the measured quantities involved and the applicable unit prices specified in the Contract.
- F. If applicable unit prices are not contained in the Agreement, the GROUP will, before ordering CONTRACTOR to proceed with desired changes, request an itemized proposal from CONTRACTOR covering the Work involved in the change after which the procedure shall be as follows:
 - 1) If the change in the Work involves additional Work, the procedure shall be as follows:

- a. If the proposal is acceptable, the GROUP will prepare a Change Order in accordance therewith for acceptance by CONTRACTOR; or
- b. If the proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the GROUP may order CONTRACTOR to proceed with the Work on a Cost-Plus-Limited Basis. A Cost-Plus-Limited Basis is defined as the net cost of the Work to CONTRACTOR plus an allowance to cover overhead and profit, as stipulated below, the total cost not to exceed a specified amount. The following allowances for overhead and profit are hereby established as reasonable and shall apply:
 - i. Fifteen-percent (15%) of the net cost of all labor furnished by CONTRACTOR. For all labor CONTRACTOR shall receive the rate of wage actually paid, as shown by its certified payroll. For all foremen in direct charge of the work, CONTRACTOR shall receive the actual wage paid the foremen, as shown on its certified payroll. No part of the salary or expense of anyone above the grade of foreman and having general supervision of the Work will be included in the labor item.
 - ii. In the case of extra Work by a SUBCONTRACTOR, the SUBCONTRACTOR shall compute its cost for the extra Work, to which it shall add fifteen-percent (15%) maximum and CONTRACTOR shall be allowed an additional five-percent (5%) of the SUBCONTRACTOR's costs for the extra Work.
 - iii. For the cost of all insurance and taxes imposed by law on labor employed on the Work, CONTRACTOR shall receive the actual amount paid.
 - iv. Ten-percent (10%) of the net cost of all materials used by CONTRACTOR, less any allowable cash or early payment discounts, delivered on the Work, including delivery charges, as shown by original receipted bills.
 - v. Rental rates for any power operated machinery, trucks, or equipment, which it may be found necessary to use on Cost-Plus-Limited work shall be negotiated between the GROUP and CONTRACTOR. These rates shall be reasonable and shall be based on those rental rates prevailing in the area where such Work is to be done, and they shall be agreed upon in writing before the Work is begun. In no case shall the rental rates exceed the rates set up in the current edition of the "Associated Equipment Distributors Compilation of Rental Rates" and shall include all repairs, fuel, lubricants, taxes, insurance, depreciation, storage and all attachments complete, ready to operate, but excluding operators. Operators and oilers (i.e., tenders) shall be paid as stated hereinabove for labor.
 - vi. No percentage for overhead and profit shall be added to the amounts of equipment rental prices agreed upon, but the price agreed upon shall be the total compensation allowed for use of such equipment.

vii. All disputes regarding Work performed on a Cost-Plus-Limited Basis under this section are subject to the appeal procedures outlined in the General Condition GC-54.

- 2) If changes in the Work requires a reduction in the Work involved, the procedure shall be as follows:
 - a. If the proposal is acceptable, the GROUP will prepare a Change Order in accordance therewith for acceptance by CONTRACTOR; or
 - b. If the proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the GROUP's REPRESENTATIVE will fix the cost value of the credit. The GROUP may then order CONTRACTOR to proceed with the work through a Change Order. Should CONTRACTOR disagree with the cost value of the credit as fixed by the GROUP's REPRESENTATIVE, it may appeal the same in accordance with the procedures outlined in the General Condition GC-54.

G. Each Change Order shall include in its final form:

- 1) A detailed description of the change in the work;
- 2) CONTRACTOR's proposal (if any) or a confirmed copy thereof;
- 3) Definite statements as to the resulting change in the Contract price and/or time; and
- 4) Statement that all Work involved in the change shall be performed in accordance with Contract requirements, except as modified by the Change Order.

H. CONTRACTOR shall not take advantage of any obvious errors in the specifications or any such error in the Contract Drawings or other Contract Documents. Any obvious errors or discrepancies in or between any of the Contract Documents shall be immediately reported to the GROUP's REPRESENTATIVE, who will make such corrections and interpretations as may be deemed necessary for the completion of the Work in a satisfactory and acceptable manner.

GC-11. CHANGES IN SUBSURFACE CONDITIONS

- A. In the event a subsurface conditions is encountered, resulting is a prolonged stoppage of activity, such that additional equipment not initially proposed for use in execution of the Work is required to be mobilized to the Site for the removal of said obstruction, CONTRACTOR may present this to the GROUP as a loss, and petition the GROUP for compensation related to this occurrence.
- B. CONTRACTOR shall not be entitled to submit a request for additional compensation for changed conditions that vary seasonally, including but not limited to groundwater fluctuations, freezing/frost, etc.
- C. Changed existing utility locations from those shown or implied by the Contract Drawings shall be the basis for a claim except as provided under General Condition GC-42.

- D. Notice of any changed conditions must be given to the GROUP's REPRESENTATIVE as soon as the event occurs, so that the GROUP's REPRESENTATIVE will have an opportunity to investigate the same and make any alterations, which in the discretion of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER may be necessary. Such notice is a material condition, which must be adhered to by CONTRACTOR.
- E. Prior to the GROUP's REPRESENTATIVE giving any consideration to CONTRACTOR's request for additional compensation, CONTRACTOR shall be obligated to submit a detailed description of such changes.
- F. The REMEDIAL DESIGNER will investigate the facts and will notify the GROUP whether the actual conditions encountered by CONTRACTOR are or are not materially different from those shown or implied on the Contract Drawings and in the Specifications.
- G. In the event of a favorable decision by the GROUP, CONTRACTOR shall be entitled to additional compensation and the amount of the additional compensation shall be determined in accordance with the provisions of the General Condition GC-12.
- H. In the event of any unfavorable decision by the GROUP, CONTRACTOR shall have the rights to contest said decision as provided for under the provisions of this Contract.

GC-12. CLAIMS FOR ADDITIONAL COSTS AND/OR TIME

- A. All claims between the parties, including all claims for additional compensation and/or additional time, arising out of, or in any way related to this Contract and/or the performance of the same, or its interpretation, except those disputes covered by Federal Labor Standards Provisions shall within ten (10) days of the event or action giving rise to such claims be presented to the GROUP's REPRESENTATIVE. All papers pertaining to such claims shall be filed in triplicate. Such notice need not detail the amount of the claim but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, CONTRACTOR shall proceed with the Work, as directed. Any claim not presented within the time limit specified in this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is to be given within ten (10) days of its commencement, the claim will be considered only for period commencing ten (10) days prior to receipt by the GROUP's REPRESENTATIVE of notice thereof. CONTRACTOR shall in no case allow any claim or dispute to delay the Work.
- B. Within ten (10) days after the initial notice of a claim, as described above, CONTRACTOR shall prepare and submit its claim in final form complete with costs and schedule impacts and all supporting information/data. Should the claim be of a continuing nature, CONTRACTOR shall submitted its claim in final form, as of the last day of each month during its continuance.
- C. As soon as practicable after the final submission of all information the GROUP will make a determination of any submitted claims. Said decision of the GROUP shall be a

condition precedent to any further action on the claim. However, upon certification in writing by the claimant that the claim has been submitted in its final form, the GROUP will be obliged to render a decision on said claim within sixty (60) days of the date of said certification. Should the GROUP fail to render its decision within the aforementioned sixty (60) day period, its decision will not be a condition precedent to any further action on the part of the claimant.

- D. There shall be no added compensation paid for delay to CONTRACTOR unless the GROUP causes said delay by material breach of this Contract, and compliance with the foregoing notice provisions shall be a condition precedent to the prosecution of any such claim.
- E. Claims for additional compensation for additional Work, due to alleged errors in ground elevations, contour lines, or benchmarks, will not be considered unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which results, or would result, in handling more material, or performing more Work, than would be reasonably estimated from the Contract Drawings.
- F. If, on the basis of the available evidence, the GROUP determines that an adjustment of the Contract Price and/or time is justifiable, the procedure shall be as provided in General Conditions GC-10, GC-11, GC-12, and GC-13.
- G. In the event of an unfavorable decision by the GROUP, CONTRACTOR shall have the right to contest said decision, as provided for under the provisions of this Contract.

GC-13. TERMINATION, DELAYS AND EXTENSIONS, AND LIQUIDATED DAMAGES

- A. Termination of Contract: For its own convenience the GROUP may, at any time prior to the issuance of a Notice to Proceed (NTP), void this Contract by giving unequivocal and unconditional written notice of such voidance to CONTRACTOR, and in the event of such voidance the GROUP will not be liable to CONTRACTOR for any claims or losses, including anticipated loss of profit and moneys expended in anticipation of performance of the Work specified by this Contract.

At any time subsequent to the NTP, the GROUP may, at its convenience, terminate the Contract by giving unequivocal and unconditional written notice of such termination to CONTRACTOR. In the event of such termination by the GROUP, the GROUP will be responsible to CONTRACTOR for the following moneys only, which moneys shall be subject to legitimate charges of the GROUP against CONTRACTOR:

- 1) All reasonable costs incurred by CONTRACTOR in performance of or in anticipation of performance of the Contract provided CONTRACTOR shall take all reasonable steps to mitigate such damages including the return and/or re-sale of materials ordered; and
- 2) A mark-up of ten-percent (10%) for profit and ten-percent (10%) for overhead on the reasonable cost of the Work completed and in place, in accordance with the Contract Drawings and Specifications, to the date of termination. CONTRACTOR

shall remain responsible for the Work completed, in accordance with the Contract provisions.

Should any work under this contract be subject to, or terminated by the action of any third party, governmental unit/body/agency, or court due to any reason, including environmental or ecological, the rights of CONTRACTOR to recover from the GROUP shall be determined as set forth above.

The GROUP may give notice, in writing, to CONTRACTOR and his surety of any material breach of this Contract by CONTRACTOR to include, but not be limited to, any of the following:

- 1) Failure to begin the Work under this Contract within the time specified;
- 2) Failure to perform the Work with sufficient workmen, equipment, or materials to insure the prompt completion of said Work;
- 3) Unsuitable performance of the Work or failure to perform any additional Work to correct such rejected, defective, or unsuitable Work;
- 4) Neglecting or refusing to remove material rejected, as defective and unsuitable;
- 5) Discontinuing the suitable prosecution of the Work for a period of seventy-two (72) hours, excluding Sundays and holidays, without written authorization from the GROUP's REPRESENTATIVE;
- 6) Failure to commence discontinued Work within forty-eight (48) hours following notice to resume such discontinued Work (excluding Sundays and holidays);
- 7) Becoming insolvent or declared bankrupt, or committing any act of bankruptcy or insolvency;
- 8) Allowing any final judgment to stand against CONTRACTOR unsatisfied for periods equal to or greater than ten (10) calendar days;
- 9) Making any assignment for the benefit of creditors; and
- 10) Violating any terms, conditions, covenants, and/or provisions presented in the Contract Documents.

CONTRACTOR's Surety, within a period of ten (10) calendar days after such notice of default, shall take all appropriate and necessary actions to correct said material breaches of Contract. Should said actions fail to meet with the approval of the GROUP, the GROUP may, at its discretion, order the Surety to complete the Work or, without violating the Contract, take the prosecution of the Work out of the hands of said Contractor and Surety.

The GROUP may appropriate or use any or all materials and equipment on the ground as may be suitable and acceptable and may enter into an agreement, either by negotiation or public letting, for the completion of said Contract according to the terms and provisions thereof, or use such other methods or combinations thereof, as in its opinion will be required or desirable for the completion of said Contract in an acceptable manner. All costs and charges incurred by the GROUP, together with the cost of completing the work under Contract, shall be deducted from any monies due or which may become due to said CONTRACTOR. In case such expense shall exceed the sum which and would have been payable under the Contract, CONTRACTOR and the Surety shall be liable and shall pay to the GROUP the amount of said excess.

- B. Excusable Delays and Extensions of Time: The right of CONTRACTOR to proceed shall not be terminated nor shall CONTRACTOR be charged with liquidated damages for any delays in the completion of the Work due:
- 1) To any acts of the government, including controls or requisitioning of materials, equipment, tools, or by labor, by reason of war, National Defense, or any other national emergency;
 - 2) To any acts of the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or agents of the GROUP; or injunction or litigation against the GROUP;
 - 3) To causes not reasonably foreseeable by the both parties to this Contract at the time of the execution of this Contract, which are beyond the control and without the fault or negligence of CONTRACTOR, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of some other contract with the GROUP, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions; and
 - 4) To any delay of any SUBCONTRACTOR occasioned by any of the causes specified above.

If CONTRACTOR believes it has experienced an excusable delay and requests and extension of time, CONTRACTOR shall promptly notify the GROUP in writing within ten (10) days of CONTRACTOR becoming knowledgeable of such delays, and show appropriate cause for such delays. Upon receipt of such notification and all necessary supporting data, the GROUP will ascertain the facts, causes, and extent of such delays. If, upon the basis of the facts and the terms of this Contract, the delay is properly excusable, the GROUP will extend the time for completing the Work for a period of time commensurate with the period of excusable delay.

No claim for damages or any claim other than for an extension of time and for reimbursement of additional direct costs actually incurred, as a result of such excusable delay, as herein provided shall be made or asserted against the GROUP by reason of any delay.

- C. Liquidated Damages for Delay: If the Work is not completed within the time stipulated in Supplementary Condition SC-1, including any extensions of time for excusable delays, as herein provided, CONTRACTOR shall pay to the GROUP as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) for each calendar day of delay, until the Work is completed, the amount as set forth in Supplementary Condition SC-2, and CONTRACTOR and its sureties shall be liable to the GROUP for the amount thereof.

GC-14. RIGHT TO STOP OR SUSPEND THE WORK

- A. If the Work is defective or if CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment or fails to furnish or perform the Work in such a way that the completed work shall conform to the Contract Documents, the GROUP's REPRESENTATIVE may order CONTRACTOR to stop the Work or any portion thereof until the cause for such order has been eliminated. This right of the

GROUP to stop work shall not give rise to any duty on the part of the GROUP or the GROUP's REPRESENTATIVE to exercise this right for the benefit of CONTRACTOR or any other party.

- B. The GROUP may at any time and without cause suspend this Contract or any portion thereof for a period of not more than one hundred eighty (180) days by notice in writing to CONTRACTOR that shall fix the date on which Work shall be resumed. CONTRACTOR shall resume Work on the date so fixed, and may be entitled to an extension of the Contract time in accordance General Conditions GC-12 and GC-13.
- C. If the performance of all or part of the Work is suspended for an unreasonable period of time by an act of the GROUP or the GROUP's REPRESENTATIVE or by failure of the GROUP or the GROUP's REPRESENTATIVE to act within the time specified in this Contract, the CONTRACTOR shall be entitled to an equitable adjustment, per the conditions of this Contract. No equitable adjustment shall be allowed for any failures by CONTRACTOR, including failure of supervision, which subsequently resulted in the Work being suspended.
- D. No claims for an equitable adjustment shall be allowed for: 1) any costs incurred prior to the date CONTRACTOR was notified by the GROUP in writing of the act or failure to act involved, but this requirement shall not apply as to a claim resulting from a suspension order; 2) any claim for an extension of time required for performance, unless within twenty (20) days after the act or failure to act involved, CONTRACTOR submits to the GROUP a written statement setting forth, as then practicable the extent of such claimed time extension; and 3) unless the claims for a time extension in an amount stated are asserted in writing within twenty (20) days after the end of such suspension, delay, or interruption.

GC-15. ASSIGNMENT OR NOVATION

- A. CONTRACTOR shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the GROUP; provided, however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the GROUP. In the event of any assignments made to banks, trust companies, or other financial institutions, CONTRACTOR shall provide written notice to the GROUP.
- B. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of CONTRACTOR's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered and materials, tools, and equipment supplied for the performance of the Work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

GC-16. GROUP'S REPRESENTATIVE AND REMEDIAL DESIGNER'S AUTHORITY

- A. The GROUP's REPRESENTATIVE will decide all non-technical questions, which may arise in relation to the Work and construction thereof, and the REMEDIAL DESIGNER will decide all technical questions, which may arise in relation to the Work and the construction thereof.
- B. The GROUP's REPRESENTATIVE's and the REMEDIAL DESIGNER's estimates, interpretations, and decisions shall be final and conclusive, except as herein otherwise expressly provided.
- C. In case any question shall arise between the parties hereto relative to said Contract, the determination or decision of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall be a condition precedent to the right of CONTRACTOR to receive any money or payment for work under this Contract affected in any manner or to any extent by such question.

GC-17. TECHNICAL SPECIFICATIONS AND CONTRACT DRAWINGS

- A. Anything mentioned in the Technical Specifications and not shown on the Contract Drawings or shown on the Contract Drawings and not mentioned in the Technical Specifications shall be of like effect, as if shown on or mentioned in both.
- B. In cases of difference between the Contract Drawings and Technical Specifications, the Technical Specifications shall govern.

GC-18. SHOP DRAWINGS

- A. All required shop drawings, machinery details, layout drawings, working drawings, material, and equipment descriptions, etc., shall be submitted to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, in four (4) copies, for review sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. CONTRACTOR shall allow four (4) weeks for checking from the date of receipt by the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.
- B. CONTRACTOR, with the approval of the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, may submit manufacturer's literature as a substitute for, or supplement to, the requisite shop drawings, etc. The minimum size for any submission shall be 8-1/2" x 11" and the maximum size shall be the size of the Contract Drawings. All shop drawings, etc. and/or printed matter submitted shall be properly identified by project and specific application with reference to Contract Drawing number and specification items.
- C. No construction, purchase, delivery, installation, or Work shall be done or made on any part or feature of this Contract, which is dependent upon shop drawing review, until such review has been received from the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. If CONTRACTOR proceeds without reviewed shop

drawings, it shall be at its own risk. No claim by CONTRACTOR, for extension of the Contract time will be granted by reason of its failure in this respect.

- D. Shop drawings, etc., or printed matter shall give all dimensions, sizes, etc. to enable the REMEDIAL DESIGNER to determine suitability of the construction, installation, material or layout for the purposes intended. Where needed for clarity, the drawings shall include outline, sectional views and detailed working dimensions and designations of the kind of material, machine work, finish, etc., required. The drawings to be submitted shall be coordinated by CONTRACTOR with any other drawings previously reviewed, with the design and function of any equipment or structure and the Contract Drawings.
- E. Any shop drawings, etc., submitted without CONTRACTOR's stamp of approval will not be considered and will be returned to CONTRACTOR for proper resubmission. By approving and submitting shop drawings, etc., CONTRACTOR thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so and that he has checked and coordinated each shop drawing, etc. with the requirements of the work and of the Contract Documents.
- F. If any drawings show variations from the requirements of the Contract because of standard shop practice and/or other reasons, CONTRACTOR shall make specific mention of such variation in its letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of the contract price and/or time; otherwise, CONTRACTOR will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been reviewed.
- G. After review, the submittals will be stamped "No Exceptions Taken", "Make Corrections Noted", "Amend-Resubmit", or "Rejected-Resubmit". Drawings marked "No Exceptions Taken" and "Make Corrections Noted" will be returned to CONTRACTOR for its use and distribution to his suppliers and/or Subcontractors. In the case of those stamped "Amend-Resubmit" or "Rejected-Resubmit", two (2) prints will be returned to CONTRACTOR who shall make all indicated corrections and resubmit four (4) new copies of the revised submittal.
- H. In any submission that is noted as "No Exceptions Taken" or "Make Corrections Noted", the review shall not extend to details or dimensions and shall not relieve CONTRACTOR from his responsibility for compliance with the Contract Drawings and Specifications.
- I. When CONTRACTOR proposes a revision to a previously submitted shop drawing, etc., four (4) copies shall be resubmitted for review. This re-submittal shall clearly indicate, in a revision block, the date, description, and location of the revision. The letter of transmittal shall state the reasons for the revision.
- J. CONTRACTOR shall furnish as many copies of the submittals, as is necessary for the proper coordination of the work, and shall maintain a complete set of the reviewed submissions at the Site of the Work at all times.

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- K. Upon the final acceptance of the project, CONTRACTOR shall furnish the GROUP, at the GROUP'S option, with a complete set of shop drawing tracings and/or reproducible cloth reproductions of the shop drawing tracings.
- L. There will be no direct payment made for any of the above submittals, or reproducible drawings if required, but the cost thereof shall be considered as included in the general cost of the work.
- M. See Section 01300 of the Specification for additional requirements.

GC-19. REQUESTS FOR SUPPLEMENTARY INFORMATION

- A. It shall be the responsibility of CONTRACTOR to make timely requests of the GROUP for any additional information not already in its possession which should be furnished by the GROUP under the terms of this Contract, and which it will require in the planning and execution of the work. Such requests may be submitted from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.
- B. Each request shall be in writing, and list the various items and latest date by which each will be required by CONTRACTOR. The first list shall be submitted within two (2) weeks after Contract award, and shall be as complete as possible at that time. CONTRACTOR shall, if requested, furnish promptly any assistance and information the GROUP'S REPRESENTATIVE and REMEDIAL DESIGNER may require in responding to these requests for supplementary information.
- C. CONTRACTOR shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this General Condition.

GC-20. MATERIALS AND WORKMANSHIP

- A. Unless otherwise specifically provided for in the Specifications, all workmanship, equipment, materials and articles incorporated in the Work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles, or workmanship are referred to in the Specifications as "equal to" or "equivalent to" any particular standard, the REMEDIAL DESIGNER will solely decide the question of equality.
- B. All work performed and all materials furnished shall be in conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances shown on the Contract Drawings or indicated in the Specifications.
- C. CONTRACTOR shall furnish to the GROUP for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work.

- D. Machinery, mechanical and other equipment, materials, or articles installed or used without such prior approval shall be at the risk of subsequent rejection.
- E. Materials specified by reference to the number or symbol of a specific standard, such as an ASTM Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Request for Bids, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as modified in the Specifications, shall have full force and effect, as though printed therein.
- F. CONTRACTOR shall employ only competent and skillful personnel to do the Work. Whenever the GROUP'S REPRESENTATIVE notifies CONTRACTOR, in writing, that any person on-Site is, in its opinion, incompetent, unskillful or disorderly, CONTRACTOR shall forthwith remove such person and shall not again employ him/her on any part of the Work without the written consent of the GROUP'S REPRESENTATIVE. In no event shall notifications (or lack thereof) of the GROUP'S REPRESENTATIVE under this section modify or alleviate CONTRACTOR'S obligation to employ only competent and skillful personnel to do the Work
- G. The GROUP may stop any Work or any part of the Work under the Contract, if the GROUP believes that methods or conditions are such that unsatisfactory Work might result, if improper materials or workmanship is being used, or if unsafe conditions exist or will be created.
- H. In the event the materials furnished or the Work performed deviates from the requirements of the Contract Drawings and Specifications, but, in the opinion of the GROUP, constitutes substantial performance, the GROUP may accept the same. Should the deviation in question result in a savings to CONTRACTOR the GROUP will be entitled to a credit in the full amount of said savings. Should the deviation in question result in additional costs to CONTRACTOR, the GROUP will not be liable to CONTRACTOR for such additional cost.
- I. If the materials or the finished product in which the materials are used or the work performed are not in conformity with the Contract Drawings and Specifications and have resulted in an inferior or unsatisfactory product, the Work and materials shall be removed and replaced or otherwise corrected by and at the expense of CONTRACTOR.

GC-21. SAMPLES, CERTIFICATES, AND TESTS

- A. CONTRACTOR shall submit all samples, materials, certified test reports, materials certificates, certificates of compliance, affidavits, etc., as called for in the Contract Documents or required by the REMEDIAL DESIGNER, promptly after award of the Contract and acceptance of CONTRACTOR'S bonds. No such materials and/or equipment, etc., shall be manufactured or delivered to the Site, except at CONTRACTOR'S own risk, until the required samples, certificates, tests, etc., have been approved in writing by the REMEDIAL DESIGNER. Any delays in the Work

caused by late or improper submission of the above for approval shall not be considered just cause for an extension of the Contract time.

- B. Samples: Unless otherwise specified, CONTRACTOR shall furnish the required samples without charge, and shall provide every facility for the securing of material samples. CONTRACTOR shall provide means and assist in the verification of all scales, measures, and other devices that it operates. Samples to be submitted will be taken by the REMEDIAL DESIGNER or a laboratory approved by the GROUP, unless otherwise specified. All materials being used shall be subject to re-sampling and testing at any time during their preparation and/or use.
- C. All samples submitted by CONTRACTOR shall be properly identified to include, but not be limited to, the project name, project number, item number, and description of material, name of the producer, place of origin, and other detailed information which will assist the REMEDIAL DESIGNER passing upon the acceptability of the sample. Certified test reports, materials certificates and/or certificates of compliance required to be submitted with the samples or if permitted in lieu of samples, shall conform to the requirements stated hereafter.
- D. Certified Test Reports: A certified test report shall be a document containing a list of the dimensional, chemical, metallurgical, electrical, and physical results obtained from an actual test of the materials involved, and shall certify that the materials meet the requirements of the Contract Drawings and Specifications, and at a minimum shall also include the following information:
- 1) Item number and description of material;
 - 2) Date of manufacture;
 - 3) Date of testing;
 - 4) Name of organization to whom the material is consigned;
 - 5) Quality of material represented, such as batch, lot, group, etc.;
 - 6) Means of identifying the consignment, such as label, marking, lot number, etc.;
 - 7) Date and method of shipment; and
 - 8) Name of organization performing tests.

Certified test reports shall be signed by an authorized and responsible agent for the organization manufacturing the material, and they shall be duly notarized.

- E. Material Certificates: Material certificates shall be documents certifying that the materials, components, and equipment furnished, conform to all requirements of the Contract Drawings and Specifications. At a minimum, said material certificates shall include the following information:
- 1) Project to which the material is consigned;
 - 2) Name of Contractor to whom material is supplied;
 - 3) Item number and description of material;
 - 4) Quantity of material represented by the certificate;
 - 5) Means of identifying the consignment, such as label, marking, lot numbers, etc.;
and
 - 6) Date and method of shipment.

Material certificates shall be signed by an authorized and responsible agent for the organization supplying the material, and they shall be duly notarized.

F. Certificates of Compliance: A certificate of compliance shall be a document certifying that the materials, components, and equipment covered by the previously submitted certified test report and materials certificate have been installed in the work, and that they conform to all the requirements of the Contract Drawings and Specifications. At a minimum, the following information shall also be required on these documents:

- 1) Project number;
- 2) Item number and description of material;
- 3) Quantity represented by the certificate; and
- 4) Name of manufacturer.

Certificates of compliance shall be signed by an authorized and responsible agent for the prime Contractor, and shall be duly notarized.

G. Tests: Tests, as required by the Specifications, will be made in accordance with standards in effect at the time of bidding, unless otherwise specified on the Contract Documents. Representative preliminary samples of the material proposed for use shall be submitted, without charge, by CONTRACTOR or producer for examination and tested in accordance with specified methods. All materials being used are subject to test or rejection at any time during their preparation and use. Materials will be rejected by the REMEDIAL DESIGNER whenever, in his judgment, they fail to meet the requirements of the specifications. The GROUP reserves the right to retest all materials which have been tested and accepted at the source of supply, after the same have been delivered, and to reject all materials which, when retested, do not meet the requirements of the specifications.

H. Approval/Acceptance: Approval of any materials shall be general only and shall not constitute a waiver of the GROUP's right to demand full compliance with Contract requirements. After actual deliveries, the REMEDIAL DESIGNER will have such check tests made, as it deems necessary, in each instance and may reject materials and equipment and accessories that fail to meet any check tests may cause their removal and replacement by proper materials or demand and secure such reparation by CONTRACTOR as is equitable.

I. The REMEDIAL DESIGNER may accept a material or combination of materials and therefore waive non-complying test results provided that all of the following conditions are met:

- 1) Results of prior and subsequent series of tests of the material or materials from the same source or sources are found satisfactory;
- 2) Incidence and degree of nonconformance with the specification requirements are, in the REMEDIAL DESIGNER's judgment, within reasonable and practical limits;
- 3) CONTRACTOR has diligently exercised material controls consistent with good practices in the REMEDIAL DESIGNER's judgment; and

- 4) No adverse effect on the value or serviceability of the completed Work could result.
- J. The REMEDIAL DESIGNER may, at his discretion, waive testing of minor quantities of material when such material is obtained from sources that have previously and consistently met specification requirements as demonstrated by testing.
- K. Sample, Certificate, and Test Costs:
- 1) CONTRACTOR shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the REMEDIAL DESIGNER, and CONTRACTOR shall pay all other testing costs of said samples;
 - 2) CONTRACTOR shall assume all costs of retesting materials which fail to meet Contract requirements; and
 - 3) CONTRACTOR shall assume all costs of testing materials offered in substitution for those found deficient or for those specified.

GC-22. PERMITS AND CODES

- A. CONTRACTOR shall obtain and pay for all required permits, approvals, and licenses required for the Work unless already obtained. CONTRACTOR shall pay all government charges and inspection fees necessary for the prosecution of the Work and applicable at the time of opening bids or, if there are no bids, on the effective date of the Contract. CONTRACTOR shall pay all charges of utility owners for connections to the Work. Contractor will notify the GROUP's Representative before seeking any work permits, approvals or licenses.
- B. CONTRACTOR shall give all notices required by and shall observe and comply with all Federal and State laws and Local by-laws, ordinances and regulations in any manner affecting the conduct of the work, and all such orders or decrees as may exist at present and those which may be enacted later, of bodies or tribunals having any jurisdiction or authority over the work.
- C. CONTRACTOR shall indemnify and save harmless the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER and all of their officers, representatives, agents, and servants against any claim or liability arising from or based on the violation of any such law, bylaw, ordinance, regulation, order of decree, whether by its employees.
- D. All construction, work, and/or utility installations shall comply with all applicable ordinances and/or codes including any and all written waivers thereto.
- E. Before commencing any Work, CONTRACTOR shall examine the Contract Drawings and Specifications for compliance with applicable ordinances, codes, etc., and shall immediately report any discrepancy to the GROUP. Where the requirements of the Contract Drawings and Specifications fail to comply with such applicable ordinances, codes, etc., the GROUP will adjust the Contract by Change Order to conform to such

ordinances, codes, etc., (unless waivers in writing covering the differences have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.

- F. Should CONTRACTOR fail to observe the foregoing provisions and proceed with the construction of work and/or install any utility at variance with any applicable ordinance, code, etc., including any written waivers (notwithstanding the fact that such installation is in compliance with the Contract Drawings and Specifications), CONTRACTOR shall remove such work without cost to the GROUP, but a Change Order will be issued to cover only the excess cost CONTRACTOR would have been entitled to receive, if the change had been made before CONTRACTOR commenced Work on the item involved.
- G. Unless otherwise specified, CONTRACTOR shall, at his own expense, secure and pay to the appropriate department of the local, state, and federal government agency fees or charges for all permits including, but not limited to, those required for street pavements, sidewalks, sheds, removal of abandoned water taps, sealing of connection drains, pavement cuts, buildings, electrical plumbing, water, gas, and sewer permits, etc., required by the regulatory body or any of its agencies.
- H. CONTRACTOR shall comply with applicable local, state, federal laws, ordinances, codes, etc., governing the transportation and disposal of surplus excavation, materials debris and rubbish on or off the Site, and commit no trespass on any public or private property in any operation due to or connected with the Work under this Contract.
- I. All non-hazardous samples and by-products from sampling processes in connection with the Work shall be disposed of by CONTRACTOR in accordance with applicable federal, state, and locale rules, regulations, laws, and codes.
- J. Any and all waste materials generated in connection with the Work, including samples and by-products from sampling processes that cannot be introduced back into the environment under applicable law without additional treatment, empty containers, residues, and contaminated media, and all hazardous wastes or radioactive wastes related to the Work, shall be packaged in accordance with applicable law by CONTRACTOR. CONTRACTOR shall identify appropriate alternatives for off-site treatment, storage or disposal of the material at facilities that are, as applicable, approved by EPA and state and local regulatory agencies. The GROUP shall select the final alternative, and CONTRACTOR shall not make any independent determination relating to the selection of a treatment, storage, or disposal facility.
- K. As the GROUP's agent, CONTRACTOR shall provide or subcontract for personnel, equipment and materials required for the transportation of the material to the selected facility. As the GROUP's agent, CONTRACTOR shall comply with all applicable law and shall ensure that, prior to transport, all waste is properly described, packaged, marked and labeled, and is in proper condition for transportation according to all applicable standards and regulations, including without limitations the standards and regulations of the United States Department of Transportation ("DOT"), EPA, and NJDEP. CONTRACTOR shall procure all necessary permits and licenses and other forms of documentation required relating to the waste material to be transported,

treated, stored, disposed or processed hereunder. CONTRACTOR shall promptly furnish the GROUP with copies of all such permits, licenses or other documents.

- L. CONTRACTOR shall sign all necessary manifests for the disposal of the material. CONTRACTOR will provide copies of completed manifest documents to the GROUP.

GC-23. TAXES

- A. CONTRACTOR shall pay all sales, consumer, use, service, excise, payroll, and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the place of the Project that are applicable during the performance of the Work.

GC-24. CARE OF WORK

- A. CONTRACTOR acknowledges that the GROUP is relying upon the accuracy, competence, and completeness of Work rendered under this Agreement.
- B. CONTRACTOR warrants that the Work performed hereunder shall be of good quality, free from material fault or defect; be performed in accordance with, at minimum, the reasonable and customary codes and standards of good practice prevailing in the environmental services industry at the time of performance; be performed strictly in accordance with the RI/FS AOC; be performed by properly qualified and trained personnel; and conform to the specifications of the Contract Documents.
- C. CONTRACTOR warrants that it is familiar with the type of problems typically encountered in performing this type of work, and that Contractor has the capability, experience, and resources to perform the Work in a professional and timely manner consistent with the Contract Documents.
- D. CONTRACTOR shall keep any area where Work is being performed free from unnecessary accumulation of waste materials and rubbish from CONTRACTOR or any Subcontractor, and in a neat and orderly condition.
- E. CONTRACTOR shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the GROUP.
- F. Materials shall be stored so as to insure the preservation of their quality and fitness for the work and shall be located so as to facilitate prompt inspection. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces and not on the ground and, when directed, shall be placed in weatherproof buildings.
- G. Stored materials, even though approved before storage, shall be inspected prior to their use in the work and shall meet the requirements of the specifications at the time it is proposed to use them.

- H. CONTRACTOR shall at his sole expense and without any additional cost to the GROUP provide watchmen and/or other security measures as may be reasonably required to properly protect and care for materials and work completed, and to otherwise prevent property damage and/or personal injury.
- I. In an emergency affecting the safety of life or property, including adjoining property, CONTRACTOR, without special instructions or authorization from the GROUP, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. CONTRACTOR shall likewise act, if instructed to do so by the GROUP. Any compensation claimed by CONTRACTOR on account of such emergency work will be determined by the GROUP, as provided in General Conditions GC-10 and GC-12.
- J. CONTRACTOR shall avoid damages as a result of its operations to existing sidewalks, streets, curbs, pavements, utilities (except those, if any, which are to be replaced or removed), adjoining property, etc., and shall at his own expense completely repair, in kind, any damage thereto caused by its operations.
- K. CONTRACTOR shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the Site, which may be in any way affected by the excavations or other operations connected with the construction of this Contract.
- L. CONTRACTOR shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. CONTRACTOR shall indemnify and save harmless the GROUP, the GROUP's REPRESENTATIVES, and the REMEDIAL DESIGNER from any damages for which the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER may become liable in consequence of such injury or damage to the Work or adjoining and adjacent structures and/or their premises.

GC-25. ACCIDENT PREVENTION

- A. CONTRACTOR shall exercise proper precautions and safety measures at all times for the protection of persons and/or property and shall be responsible for all injuries and/or damages to all persons and/or property, either on or off the site, which occur as a result of his prosecution of the work under this Contract.
- B. The safety provisions of all applicable local, state, and federal laws, and building and construction codes, shall be observed and CONTRACTOR shall take or cause to be taken such additional safety and health measures as the GROUP may determine to be reasonably necessary.
- C. Machinery, equipment and trucks shall be properly guarded, and operational hazards shall be eliminated in accordance with the provisions and intent of the latest revised edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws.

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- D. See General Condition GC-30 and Section 01564 of the Specification for additional Health and Safety requirements.

GC-26. SANITARY FACILITIES

- A. CONTRACTOR shall furnish, install, and maintain ample sanitary facilities for its workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the Health and Sanitary Codes of the local, state, and federal governments.
- B. Drinking water shall also be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health and sanitary regulations.

GC-27. USE OF PREMISES

- A. CONTRACTOR shall confine its equipment, storage of materials, and construction operations to the Contract Limits, as shown on the Contract Drawings and as prescribed by ordinances or permits, or as may be directed by the GROUP, and shall not unreasonably encumber the Site or public “rights-of-way” with its materials and construction equipment.
- B. CONTRACTOR shall comply with all instructions of the GROUP, the GROUP’s REPRESENTATIVE, the REMEDIAL DESIGNER, and the ordinances, codes, etc., of the local, state, and federal governing bodies, regarding signs, advertising, traffic, fires, explosives, danger signals, barricades, etc.

GC-28. REMOVAL OF DEBRIS, CLEANING, ETC.

- A. CONTRACTOR shall, periodically or as directed by the GROUP’s REPRESENTATIVE during the progress of the work, remove and legally dispose of all surplus non-contaminated debris, and keep the Site and public “rights-of-way” reasonably clear.
- B. Upon completion of the work, prior to final inspection, CONTRACTOR shall remove all temporary construction facilities, debris, and unused materials provided for the Work, and put the whole Site and public “rights-of-way” in a neat and clean condition.
- C. The cost of all required debris removal and clean-up shall be included in the various prices bid under this Contract.

GC-29. INSPECTION/ACCEPTANCE OF THE WORK

- A. All materials and workmanship shall be subject to inspection, examination, or testing by the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER to determine

the acceptability of the Work at any and all times during manufacture or construction is carried on, and CONTRACTOR shall provide proper facilities for such access and inspection.

- B. The GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER shall have the right to reject defective materials and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Site, and replaced with materials of specified quality without additional charge/cost to the GROUP.
- C. If CONTRACTOR fails to proceed at once with the correction of rejected workmanship or defective material, the GROUP may by Contract or otherwise have the defects remedied or rejected materials removed from the Site and charge the cost of the same against any monies due or may become due to CONTRACTOR, without prejudice to any rights or remedies of the GROUP.
- D. CONTRACTOR shall furnish promptly all materials reasonably necessary for any tests that may be required. All tests by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER will be performed in such manner as not to delay the Work unnecessarily and shall be made as required by the Specifications.
- E. If the Specifications, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, laws, ordinances, or any public authority require any portion of the Work to be specifically tested and approved, CONTRACTOR shall provide the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER timely notice of its readiness for inspection. If by an authority other than the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER (such as a testing organizations designated by the GROUP), CONTRACTOR shall provide fixed dates for such inspection. If any work should be covered up without approval or consent of the REMEDIAL DESIGNER, it must, if required by the REMEDIAL DESIGNER, be uncovered for examination and properly restored at CONTRACTOR's expense.
- F. CONTRACTOR shall notify the REMEDIAL DESIGNER sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the REMEDIAL DESIGNER, CONTRACTOR shall uncover for inspection and recover such facilities all at its own expense, when so requested by the GROUP's REPRESENTATIVE or REMEDIAL DESIGNER.
- G. Should it be considered necessary or advisable by the REMEDIAL DESIGNER or the GROUP's REPRESENTATIVE at any time before final acceptance of the entire work to make an examination of Work already completed, by uncovering the same, CONTRACTOR shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to meet the requirements of the Contract, payment under the provisions of General Condition GC-10 shall be allowed, and CONTRACTOR shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

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- H. Inspection of materials and appurtenances to be incorporated in the improvements specified under this Contract may be made at the place of production, manufacture, or shipment, whenever the quantity justifies it in the opinion of the REMEDIAL DESIGNER OR GROUP's REPRESENTATIVE, and such inspection and acceptance, unless otherwise stated in the Specifications, shall be final, except as regards: 1) latent defects; 2) departures from specific requirements of the Contract; 3) damage or loss in transit; or 4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Site.
- I. Neither inspection, testing, approval, nor acceptance of the Work in whole or in part by the GROUP or its agents shall relieve CONTRACTOR or its Sureties of the full responsibility for materials furnished or work performed not in strict accordance with the Contract.

GC-30. REVIEW BY GROUP

- A. The GROUP, its authorized representatives, and agents shall at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however, that all instructions and approval with respect to the Work will be given to CONTRACTOR only by the GROUP through its authorized representatives or agents.

GC-31. FINAL INSPECTION

- A. When the Work specified under this Contract has reached Final Completion, CONTRACTOR shall notify the GROUP's REPRESENTATIVE as to a suitable date for Final Inspection. The notice will be given at least ten (10) days prior to the date stated for Final Inspection, and bear the signed concurrence of the representative of the GROUP having charge of inspection.
- B. If the GROUP determines that the status of the Work is as represented, it will make the arrangements necessary to have Final Inspection commenced on the date stated in the CONTRACTOR's notice, or as soon thereafter as practicable. The inspection party may also include the representative of the Federal Agency, other Governmental Agencies, and representatives of the Local Government.

GC-32. DEDUCTIONS FOR UNCORRECTED WORK

- A. If the GROUP deems it not expedient to require CONTRACTOR to correct Work not done in accordance with Contract Documents, an equitable deduction from the Contract Price will be made by agreement between CONTRACTOR and the GROUP, and subject to settlement, in case of dispute, as herein provided.

GC-33. INSURANCE

A. "Personal Injury" means:

- 1) false arrest, detention or imprisonment, or malicious prosecution; libel, slander, defamation or violation of right of privacy; wrongful entry or eviction or other invasion of right of private occupancy; and
- 2) bodily injury, sickness or disease including death at any time resulting therefrom.

B. Workmen's Compensation:

- 1) CONTRACTOR shall carry or require that there be carried Workmen's Compensation Insurance and Employer's Liability Insurance for all its employees and those of its Subcontractors engaged in Work on the Site, in accordance with the laws of the State of New Jersey.

C. Commercial General Liability:

- 1) CONTRACTOR shall carry or require that there be carried Commercial General Liability Insurance with limits, as specified in Supplementary Condition SC-6, for:
 - a) Personal Injury: This shall protect CONTRACTOR, its SUBCONTRACTORS, and their heirs and assigns against all claims for injury to or death of one, or more than one person, because of accidents which may occur as a result from operations under this Contract; such insurance shall cover the use of all trenching machines, excavators, trucks, cranes, hoists, rollers, concrete mixers, motor vehicles, and other equipment as may be specified elsewhere, which may be used in the execution of this Contract. This Personal Injury Liability Insurance will be carried from commencement of Work to Final Inspection and Acceptance of the Work under this Contract, and will be extended to include insurance for completed operations. The completed operations portion of the Personal Injury Liability Insurance shall be extended for the entire period of the guaranty unless otherwise specified. This insurance shall cover owned, hired, and non-owned equipment.
 - b) Property Damage: This shall protect CONTRACTOR, its SUBCONTRACTORS, and their heirs and assigns from all claims for property damage, which might arise from operations under this Contract. Property Damage Liability shall be extended to include insurance for completed operations. The completed operations portion of the Property Damage Liability Insurance shall be extended for the entire period of the guaranty unless otherwise specified.
 - c) Manufacturers' and Contractors' Liability shall not exclude liability for personal injury or damages to property as a result of blasting, explosion, collapse of buildings or structures, and damage to underground installations.

D. Automotive Liability:

- 1) CONTRACTOR shall carry or require that there be carried Automotive Liability Insurance for personal injury and property damage with the limits, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR, its SUBCONTRACTORS, and their heirs, and assigns from all claims for any personal injury or property damage caused by an occurrence and arising out of the ownership, maintenance or use, including loading and unloading, of any vehicles during the operations under this Contract. This coverage shall include coverage for owned, hired, and non-owned vehicles.

E. Pollution Liability:

- 1) Contractor's Pollution Liability: CONTRACTOR shall carry or require that there be carried insurance, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR against losses caused by pollution conditions that arise from the operations of the CONTRACTOR or any SUBCONTRACTORS, suppliers, vendors, and agents, of all tiers, described under the scope of work of this Contract. Provide insurance coverage for:
 - a) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;
 - b) Property damage, including physical injury or destruction of tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed; and
 - c) Defense including costs, charges, and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages.
- 2) Pollution Legal Liability: CONTRACTOR shall carry or require that there be carried insurance, as specified in the Supplementary Condition SC-6, to protect CONTRACTOR against losses that arise from the insured facility that is accepting any waste under this Contract. If the scope of services under this Contract requires the disposal of any hazardous or non-hazardous materials away from the Site, CONTRACTOR shall direct the disposal site operator to furnish a Certificate of Insurance for Pollution Legal Liability with coverage for:
 - a) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;
 - b) Property damage including physical injury, or destruction of, tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed; and
 - c) Defense including costs, charges, and expenses incurred in the investigation, adjustment, or defense of claims for such compensatory damages.
- 3) Coverage shall apply to sudden and non-sudden pollution conditions, including the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants, or pollutants into or upon land, the atmosphere or any water course or body of water, which results in bodily injury or property damage. The policy shall contain

a provision that, in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery or subrogation against CONTRACTOR, the GROUP, the GROUP's REPRESENTATIVE, or the REMEDIAL DESIGNER.

F. Job Office Insurance:

- 1) CONTRACTOR, when required by Specifications, provide a job office for the use of the GROUP and the REMEDIAL DESIGNER, shall carry insurance for and in the name of the GROUP and the REMEDIAL DESIGNER, or accept full responsibility (in writing) for loss of damage to the contents to cover office records, supplies, instruments, equipment, and personal property of the GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER using said field offices.

- G. CONTRACTOR shall carry or require that there be carried any other insurance as required by Supplementary Condition SC-6.

H. Endorsements:

- 1) Commercial General Liability Insurance shall include an endorsement stating: "This policy shall cover owned, hired, and non-owned equipment." Coverage for completed operations for both personal injury and property damage extended for the period of guaranty shall be covered under this policy. Commercial General Liability coverage includes liability for personal injury or damages as a result of blasting, explosion, collapse of buildings or structures, and damage to underground installations.
- 2) Automotive Liability Insurance shall include an endorsement as follows: "This policy shall cover owned, hired, and non-owned vehicles."
- 3) All Policies shall include:
 - a) An endorsement of the Work description, Contract name, and location;
 - b) An endorsement that the Insurance Company will give at least thirty (30) days written notice to the GROUP, prior to any modification or cancellation of any such policy;
 - c) An endorsement that CONTRACTOR will be responsible for payment of all premiums and/or charges; and
 - d) An endorsement as follows: "This policy is issued in compliance with the Insurance Requirements of the Contract Documents for OU-2 Final Remedy, and the issuing Company/Agent is fully cognizant of the requirements, as stated therein."
- 4) All insurance required herein (except for Worker's Compensation and Employer's Liability) shall name the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and their officers, directors, agents, and employees as "additional insureds" under all policies.

- 5) All insurance shall be placed with carriers with a current A.M. Best's rating of no less than A, VII, unless otherwise approved by the GROUP. The required additional insured endorsements shall apply solely to work performed under this Contract. The providing of insurance, including the aforementioned additional insured endorsements, shall not be construed as CONTRACTOR's or its insurers' assumption of any liability arising out of any negligent act, omission or breach of obligation by the GROUP and/or the REMEDIAL DESIGNER.
- 6) With respect to the additional insured endorsement required under CONTRACTOR's Pollution Liability policy, the following additional terms apply:
 - a) The required additional insured endorsements shall provide coverage only with respect to claims to the extent caused by CONTRACTOR in the performance of work under this Contract;
 - b) Such endorsements shall be subject to all exclusions, exceptions, limitations, restrictions, and requirements set forth in such policies and available to Contractor under this Contract, at law, or in equity; and
 - c) The additional insured endorsements apply only to CONTRACTOR's Commercial General Liability, Automotive Liability, and Pollution Liability portion of CONTRACTOR's policies. No coverage is provided to the additional insureds in any way with respect to the Professional Liability portion of CONTRACTOR's policies.

I. Proof of Insurance:

- 1) Before commencing any work under this Contract, CONTRACTOR shall submit copies of its Certificates of Insurance to the GROUP REPRESENTATIVE evidencing that all insurance policies and limits, as required herein, are in force. The policies shall be identified by title, policy number, effective date, expiration date, coverages, and limits of liability. Required or verbatim quotes of endorsements as required above or by the Special Conditions and any non-standard exclusion endorsements for any required policies shall be attached to or be a part of the CONTRACTOR's Certificates of Insurance.
- 2) CONTRACTOR must either include coverage for his SUBCONTRACTORS in its policies or submit similar Certificates of Insurance for each SUBCONTRACTOR before their work commences. Each SUBCONTRACTOR must be covered by insurance of the same character and in no less than the same amounts as CONTRACTOR unless CONTRACTOR and the GROUP agree that a reduced coverage is adequate because of the nature of the particular Subcontracted Work.
- 3) During the course of construction under this Contract, whenever there is a lapse in the insurance requirements as stated herein, through cancellation, expiration, failure to renew, or any other cause, the GROUP shall order the cessation of all construction activities until such time as the insurance requirements are complied with. CONTRACTOR shall have no claim or claims whatever against the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or other parties due to any delays caused thereby, nor shall such delays extend the completion time of the Contract.

J. Approval/Disapproval of Insurance:

- 1) Upon receipt of the Certificate(s) of Insurance, the GROUP will, in writing, identify the policies and indicate its approval or disapproval. New policies from other companies shall be provided in place of those disapproved. Such insurance shall only be carried with financially responsible insurance companies, licensed in the State and approved by the GROUP.
- 2) All policies shall be kept in force until CONTRACTOR's work is accepted by the GROUP (unless otherwise specified). Insurance policies (covering all operations under this Contract or, if so noted for extended operations) which expire before CONTRACTOR's work is accepted by the GROUP (or where noted for extended operations, through the period of guaranty) shall be renewed and evidence of same submitted to the GROUP for its approval.

GC-34. PATENTS

- A. CONTRACTOR shall hold and save the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and their officers, employees, and agents harmless from liability of any nature or kind, including, but not limited to, court costs and attorney's fees, for or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the GROUP, unless otherwise specifically stipulated in the Specifications.
- B. CONTRACTOR shall pay all license fees and royalties related to or necessary for the Work and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of the GROUP, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be specified in the Contract Documents.

GC-35. WARRANTY OF TITLE

- A. No material, supplies, or equipment incorporated or to be incorporated in the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier.
- B. CONTRACTOR shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the GROUP free from any claims, liens or charges.

- C. Neither CONTRACTOR, nor any person, firm, or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon.
- D. Nothing, however, contained in this General Condition shall defeat or impair the right of person furnishing materials or labor to recover under any law permitting such persons to look to funds due to CONTRACTOR in the hands of the GROUP.
- E. The provisions of this General Condition shall be inserted in all Subcontracts and material Contracts, and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

GC-36. GENERAL GUARANTY

- A. Neither the "*Request for Final Payment*", nor any provision in the Contract, nor partial or entire use of the improvements embraced in this Contract by the GROUP or the public shall constitute an acceptance of Work not done in accordance with the Contract or relieve CONTRACTOR of liability in respect to any express warranties or responsibility for faulty materials or workmanship.
- B. CONTRACTOR shall promptly remedy any defects in the Work without any additional compensation and pay for any damage to other Work resulting therefrom, which shall appear within a period of twelve (12) months from the date of Final Acceptance of the Work by the GROUP.
- C. The GROUP will give notice of defective materials and work with reasonable promptness.

GC-37. REQUIRED PROVISIONS DEEMED INSERTED

- A. Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

GC-38. CORRECTIONS

- A. The REMEDIAL DESIGNER will have the right to correct any discrepancies, inconsistencies, and errors in the Contract Documents, when such corrections are necessary for the proper expression of their intent.
- B. Such corrections shall take effect from the time the REMEDIAL DESIGNER gives notice thereof, and any alterations in the Work rendered necessary thereby shall be made as corrected.
- C. Any discrepancies between the approved Contract Drawings and Specifications, or any disagreement in measurements upon the Contract Drawings must be submitted to the

GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER before construction of the Work. See General Condition GC-2 additional requirements.

GC-39. SAFETY PROVISIONS

- A. The safety provisions of applicable laws, building, and construction codes and the safety codes approved by the State Labor Commissioner shall be observed.
- B. The provisions of the Federal Occupational Safety and Health Administration's "Occupational Safety and Health Standards" and "Safety and Health Regulations for Construction" shall be observed.
- C. Should at any time during the work under this Contract any local state, and federal safety inspector visit the Site for the purpose of a safety inspection, CONTRACTOR shall immediately notify the GROUP's REPRESENTATIVE on-Site.
- D. CONTRACTOR shall employ watchmen, as necessary, shall erect and maintain such strong and suitable barriers, and shall install lights, as necessary, to effectually prevent the happening of any health and safety incidents and/or accident. Lights shall be maintained between the hours of sunset and sunrise, and during periods of low visibility.
- E. If at any time in the opinion of the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER, the Work is not properly lighted, barricaded, and in all respects safe, both in respect to public travel or adjacent property, public or private, and if under such circumstances CONTRACTOR does not or cannot immediately put the same into proper and approved condition, or if CONTRACTOR or his representative is not upon the ground so that he can be immediately notified of the insufficiency of safety precautions, then the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER may put the Work into such a condition that shall be, in their opinion, in all respects safe, and CONTRACTOR shall pay all expenses of such labor and materials as may have been used for this purpose or by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER. Such action of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, or its failure to take such action, shall in no way relieve CONTRACTOR of the entire responsibility for any cost, loss, or damage by any party sustained on account of the insufficiency of the safety precautions taken by CONTRACTOR or by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER acting under authority of his section.

GC-40. NIGHT WORK, SUNDAYS AND HOLIDAYS

- A. CONTRACTOR shall not undertake or allow any Work to be performed on-Site without the full-time presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER.
- B. Only with the prior approval of the GROUP shall night work, work on Sundays, or Work on legal holidays, be permitted except for emergencies or as specified elsewhere.

- C. Should night work be permitted or required, the lighting and other facilities which are necessary for performing such work must be provided by CONTRACTOR and comply with the applicable safety codes.
- D. CONTRACTOR may request, in writing, permission from the GROUP's REPRESENTATIVE to undertake or allow Work to be performed on-Site without the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER full-time presence. The written request will specify the precise Work to be performed, the dates and time the Work will be performed, and the justification of the necessity to undertake or allow the Work to be performed without the presence of the GROUP's REPRESENTATIVE and/or REMEDIAL DESIGNER. The GROUP's REPRESENTATIVE may grant or deny permission at its discretion.

GC-41. OBSTRUCTIONS ENCOUNTERED

- A. In addition to showing the construction under this Contract, the drawings may show certain information obtained by the GROUP regarding conditions and features, which exist at the Site of the Work, both at and below the surface of the ground. The GROUP, the GROUP's REPRESENTATIVE, and the REMEDIAL DESIGNER expressly disclaim any responsibility for the accuracy or completeness of the information given on the Contract Drawings with regard to existing conditions and features, and CONTRACTOR will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information except as provided under the Sections General Conditions GC-11 and GC-41.
- B. It is specifically called to CONTRACTOR's attention that all services, laterals, etc., are not shown on the Contract Drawings, and it shall be CONTRACTOR's responsibility to locate and protect the same, as necessary.
- C. Information regarding conditions and features, which exist at the Site of the Work, both at and below the surface of the Ground, are shown in the Contract Documents only for the convenience of CONTRACTOR, who must verify this information to its own satisfaction. The giving of this information upon the Contract Drawings will not relieve CONTRACTOR of its obligations to support and protect all existing utilities, structures, and fixtures, which may be encountered during the construction of the work, except as provided in the General Conditions GC-11 and GC-41, and to make good all damages done to such existing utilities, structures, and fixtures, as provided within the Specifications.

GC-42. EXISTING UTILITIES, STRUCTURES AND FIXTURES

- A. CONTRACTOR shall, at its own expense, do everything necessary to locate, support, protect, and sustain all sewer, water, gas, or service pipes, electric light, power poles, telephone, or telegraph poles, manholes, valve boxes, conduits, and any and all utilities, structures or fixtures laid across or along the Site of the Work.
- B. The GROUP's REPRESENTATIVE and REMEDIAL DESIGNER, as well as the company or corporation owning said utilities, structures, or fixtures, shall be notified in

writing prior to approaching, uncovering, or supporting any utility, or before any utilities, structures or fixtures are removed or relocated. In case any of the said utilities, structures or fixtures are damaged by CONTRACTOR, they shall be repaired by CONTRACTOR at its own expense, or by the authorities having control of the same, and the expense of said repairs shall be deducted from the monies due or to become due to CONTRACTOR under this Contract.

- C. Should it become necessary for CONTRACTOR to remove or relocate any utilities, structures, or other fixtures, due to a grade and alignment conflicts, which would require the proposed utility, structure, or fixture (not trench excavation, sheeting, or other construction features) to occupy the same space the existing pipe, pole, conduit, and/or other fixture, such removal or relocation will be paid for in accordance with the provisions for General Condition GC-10. Should said utilities, structures or other fixtures be removed or relocated by the GROUP or the respective utility companies at no cost to CONTRACTOR, no payment will be made therefore.
- D. Prior to any removal or relocation of existing facilities, structures, or fixtures, CONTRACTOR shall notify the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER of the location and circumstances of such, and shall cease work (which might prove detrimental to the utility, structure, or fixture encountered), if necessary until satisfactory arrangements have been made with the owners of the same to properly care for them.
- E. Should it be necessary to cease work and a delay is caused thereby, CONTRACTOR shall have no claim for damages or any claim other than for an extension of time. See General Conditions GC-12 and GC-13.
- F. If CONTRACTOR desires temporary changes of location for its convenience for any reason whatsoever, of water lines, gas lines, sewer lines, wire lines, service connections, water, and gas meter boxes, valve boxes, light standards, cableways, signals, and any other utilities, structures or fixtures, it shall satisfy the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER that the proposed relocation does not interfere with its or other Contractor's operations, or the requirements of the Contract Drawings, and does not cause an obstruction or a hazard to traffic. CONTRACTOR shall make his own request to the utility companies, pipe owners or other parties affected for such relocation work. Such relocation work for the convenience of CONTRACTOR shall be made solely at CONTRACTOR's expense.
- G. CONTRACTOR shall not remove or relocate any utility, structure or fixture without the written approval of the owner of that utility, structure or fixture unless otherwise shown on the Contract Drawings, specifications or ordered by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER.

GC-43. CONTROL OF EXISTING FLOWS

- A. During the construction of all proposed work, CONTRACTOR shall take every precaution and do the necessary work to maintain the flow of storm drainage, sanitary sewage, and natural flows through the working areas. CONTRACTOR is solely

responsible for providing all appropriate flow control systems, and there shall be no separate payment for this required work.

- B. CONTRACTOR shall be responsible for any flooding or sanitary backups on its work and to the property owners affected by such flooding or backup. CONTRACTOR shall make such provisions as may be required by the local, state, or federal health officers or any other public bodies with jurisdiction over the flows of storm drainage, sanitary seepage, and natural flows.
- C. In the event CONTRACTOR uses water from natural water sources for its operations, intake methods shall be such as to create no harmful effects; and where water is taken from a stream, reasonable flows downstream from the intake shall be maintained.
- D. CONTRACTOR shall sequence its Work such that the infiltration of rainwater across the Site is minimized to the greatest extent reasonably practical. In particular, CONTRACTOR shall take are reasonable and appropriate provisions to limit the extents of the existing geomembrane removal, and shall be required to collect/remove all infiltrated rainwater, as necessary, to maintain internal flow gradients across the perimeter soil bentonite cut-off wall.

GC-44. SEWAGE, SURFACE, GROUNDWATER AND FLOOD FLOWS

- A. CONTRACTOR shall furnish all the necessary equipment, shall take all necessary precautions, and shall assume the entire cost of on-Site management, including collection and storage, of any sewage, seepage, storm, ground water, surface, and flood flows that may be encountered at any time during the construction of the Work. The manner of providing for these flows shall meet the approval of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, and the entire cost of said work shall be incorporated into the unit or lump sum bid prices for the various items of the Work to be done under this Contract.
- B. CONTRACTOR shall employ such feasible and practical methods in its operations to prevent pollution, sedimentation, or the introduction of impurities or other objectionable materials that may become suspended or dissolved in waters reaching streams, ponds, lakes, water supplies, or other water bodies.
- C. Water shall not be disposed of by discharging it into any street gutter, drainage channel, existing drainage system, natural stream, waterway, lake, pond, or bog, etc. without prior approval of the Authority having jurisdiction thereof and the GROUP's REPRESENTATIVE. Should such approval be obtained, CONTRACTOR shall ensure that no solids, debris, suspended soil particles, impurities, or pollutants are allowed to enter the drainage system. CONTRACTOR shall be fully responsible for any damages to these systems resulting from hits disposal methods and any necessary measures (such as, but not limited to, cleanup) required to return the system to pre-construction conditions. In addition to the above, disposal on private property shall only be allowed with prior written permission of the impacted property owners.

- D. Any water used for any purpose by CONTRACTOR shall not be discharged in such a manner as to create pollution, sedimentation, or other adverse effects upon the aforementioned streams of waters.

GC-45. CONNECTING TO EXISTING WORK

- A. If appropriate to the Work, CONTRACTOR shall remove such existing masonry, concrete, equipment, and piping, as necessary and required by the Contract Documents, to make proper connections to the existing work at the locations shown.
- B. Also, CONTRACTOR shall make the necessary pipeline, roadway, and other connections at the severed points, so on completion of this Contract water, sewage, or stormwater, as the case may be, will flow through severed pipelines and structures.
- C. Unless otherwise specified herein, no extra payment will be made for this Work, but the entire cost of the same shall be included in the unit or lump sum bid prices for the various items of the Work to be done under this Contract.

GC-46. EXISTING IMPROVEMENTS

- A. CONTRACTOR shall conduct its work as to minimize damage to existing improvements, except where specifically stated otherwise in the Contract Drawings and/or Specifications, and it will be the responsibility of CONTRACTOR to restore, as nearly as practical, to their original conditions all improvements on public or private property damaged by the Work performed by CONTRACTOR.
- B. Utility mains, ducts, poles, and services in the construction area, where shown on the Contract Drawings, are at the approximate locations furnished by various utilities concerned. These locations are subject to possible errors in the source of the information, and also, errors in transcription. CONTRACTOR shall make certain of the exact location of mains, ducts, poles, and services prior to excavation or construction near the same.
- C. The various utility companies shall be made aware of the pending construction and made generally familiar with the locations of conflicts in the case of the proposed construction. The various utility companies shall be requested to make all adjustments to their own lines except where otherwise shown on the Contract Drawings or specified. CONTRACTOR shall give ample notice to the various utilities so that existing lines can be marked in the field and adjustments made. CONTRACTOR shall cooperate fully with the various utilities and shall plan its work so that least interference is caused for all parties concerned. No additional payments shall be made to CONTRACTOR for delays caused by utility interference due to negligence on the part of CONTRACTOR. CONTRACTOR shall support all utility lines uncovered during excavation.

GC-47. SITE ACCESS

- A. CONTRACTOR shall make every effort to minimize damage to all access routes, and it shall be required to restore them to their original condition. CONTRACTOR shall acquire all necessary permits for working, on or from public streets or rights-of-way, and for securing additional access rights thereto.
- B. All costs for the removal and restoration, to original conditions, of walls, fences, structures, utility lines, poles, guy wires, or anchors, and other improvements required for passage of CONTRACTOR's equipment shall be borne by CONTRACTOR. CONTRACTOR shall notify the proper authorities of the local governing bodies and all utilities of any intended modification or disruption to their property, prior to start of construction, and shall cooperate with them in the scheduling and performance of his operation.
- C. If CONTRACTOR, by direct negotiation and bargain with any land owner, leasee, or tenant has secured any right(s) to use more space or greater privileges than the space provided by the GROUP for purposes incidental to the performance of this Contract, CONTRACTOR shall, upon request of the GROUP's REPRESENTATIVE an/or the REMEDIAL DESIGNER, furnish proper written evidence that such additional rights have been properly secured and assurance that no damage to or claim upon the GROUP and/or local governing body will arise therefrom. The GROUP and/or local governing body shall not be liable in any way for any expenses incurred by CONTRACTOR in order to secure any such right(s) to use additional property.
- D. CONTRACTOR shall be responsible for and reimburse the GROUP for any and all losses, damages, or expenses that the GROUP may suffer, either directly or indirectly or through any claims of any person or party, for any trespass outside the spaces and rights-of-way provided by the GROUP to CONTRACTOR or any violation or disregard of the terms and conditions established for the use or occupancy of those rights or for negligence in the exercise of those rights.
- E. The GROUP may retain or deduct from any sum or sums due or to become due to CONTRACTOR such amount or amounts as may be proper to insure the GROUP and/or local governing bodies against loss or expense by reason of the failure of CONTRACTOR to observe the limits and conditions of the rights-of-way, rights-of-access, etc. provided by the GROUP.

GC-48. ACCESS TO ADJACENT PROPERTIES

- A. CONTRACTOR shall at all times maintain vehicular and pedestrian access to all properties abutting or adjacent to the Site under this Contract, all at CONTRACTOR's sole expense. In the event that normal access is cut off to a particular property due to operations or proposed work called for under this Contract, CONTRACTOR shall, at its sole expense, make other arrangements for access to said property satisfactory to the impacted property owner/tenant and the GROUP.

GC-49. USE OF ROADWAYS

- A. During the progress of the Work, CONTRACTOR shall make ample provision for both vehicular and foot traffic on any public road, and shall indemnify and save harmless the GROUP from any expense whatsoever due to its operations and/over said roadways.
- B. CONTRACTOR shall also provide free access to all fire hydrants, water and gas valves located along the line or in the vicinity of its Work. Gutters and waterways must be kept open or other provisions made for the removal of stormwater.
- C. In the event of CONTRACTOR's failure to comply with these provisions, the GROUP may cause the same to be done, and will deduct the cost of such work from any monies due or to become due CONTRACTOR under this Contract, but the performance of such work by the GROUP or at its insistence shall serve in no way to release CONTRACTOR from its general or particular liability for the safety of the public or the work.

GC-50. SNOW REMOVAL

- A. If CONTRACTOR's operations or occupancy of any public street or highway, or the rough surfaces over any trench or area being maintained by CONTRACTOR, shall interfere with the removal or plowing of snow or ice by the public authorities or land owners, or sanding of icy surfaces, in the ordinary manner with regular highway equipment, then CONTRACTOR shall perform such services for the said public authorities or owners without charge, or failing to do so, shall reimburse said authorities, owners, or the City for any additional costs to them for doing such work occasioned by the conditions arising from CONTRACTOR's operations, occupancy, or trench surfaces, together with any damage to the equipment of said parties by those conditions, or claims of any party for damage or injury or loss by reason of failure to remove snow or ice or to sand the icy spots under those conditions.

GC-51. WEATHER CONDITIONS/WORK IN FREEZING WEATHER

- A. In the event of temporary suspension of work, or during inclement weather, or whenever the GROUP's REPRESENTATIVE shall direct, CONTRACTOR and its SUBCONTRACTORS shall protect all Work areas and stored materials against damage or injury from the weather.
- B. If, in the opinion of the GROUP's REPRESENTATIVE, any Work or materials shall have been damaged or injured by reason of failure on the part of CONTRACTOR or any of its Subcontractors to protect its Work, such materials shall be removed and replaced at the expense of CONTRACTOR.
- C. Unless written permission is granted by the GROUP, Work liable to be affected by frost or freezing shall be suspended during freezing weather. When work proceeds under such a condition, CONTRACTOR shall provide approved facilities for heating the materials and for protecting the finished Work. If any materials or finished Work is allowed to become damage during freezing weather due to CONTRACTOR's fault,

such materials and/or finished Work shall be repaired or replaced at the CONTRACTOR's own expense.

GC-52. INTOXICATING LIQUORS/CHEMICAL SUBSTANCES

- A. CONTRACTOR shall neither permit nor suffer the introduction or use of intoxicating liquors or mind altering chemical substances upon or about the Work specified in this Contract or upon any of the grounds occupied by CONTRACTOR and its employees.
- B. If the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER believe, in its/their opinion, any person(s) working on-Site, on behalf of CONTRACTOR or any of its SUBCONTRACTORS, is intoxicated or under the influence of mind altering chemical substances, CONTRACTOR shall be directed to forthwith remove such person(s) from the Site, and said person(s) shall not be allowed to again work on any part of the remaining Work without written consent of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.

GC-53. INDEMNIFICATION

- A. CONTRACTOR shall indemnify and hold harmless the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, other Contractors, and their consultants, agents, representatives, and employees from and against all claims, demands, suits, damages, including consequential damages and damages resulting from personal injury (as defined in General Condition GC-33-A) or damage to property, costs, expenses and fees arising out of or resulting from the performance of the Work, provided that such claims, demands, suits, damages, costs, expenses and fees are caused in whole or in part by any acts or omissions of CONTRACTOR or any of its SUBCONTRACTORS, person(s), or organization(s) for whose acts CONTRACTOR is liable.
- B. In any and all claims against the GROUP, the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, or any of their consultants, agents, representatives, or employees by any employees of CONTRACTOR, any of its SUBCONTRACTORS, or any person(s) or organization(s) employed by any of them to perform or furnish any of the Work or anyone for whose acts any or them may be liable, this indemnification obligation, as presented in General Condition GC-53-A herein, shall not be limited in any way by limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR, any of its SUBCONTRACTORS, other person(s) or organization(s) under Workers' or Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.
- C. To the extent permitted by law, this indemnification obligation, as presented in General Condition GC-53-A herein, shall apply regardless of whether or not such claims, demands, suits, damages costs, expenses, and fees are caused in whole or in part by any person indemnified hereunder.

GC-54. DISPUTES

- A. All disputes between the parties arising out of, or in any way related to this Contract and/or the performance of the same, or its interpretation, except those disputes covered by Federal Labor Standards Provisions, shall within ten (10) days of the event or action giving rise to the dispute be presented to the GROUP's REPRESENTATIVE. All papers pertaining to the dispute shall be filed in triplicate. Such notice shall state the factors surrounding the dispute in sufficient detail to identify the dispute, together with its character and scope. In the meantime, CONTRACTOR shall proceed with the work under this Contract as directed.
- B. Any dispute not presented within the time limit specified above shall be deemed to have been waived, except that if the dispute is of a continuing character and notice of the dispute is not given within ten (10) days of its commencement, the dispute will be considered only for a period commencing ten (10) days prior to the receipt by the GROUP's REPRESENTATIVE of notice thereof. CONTRACTOR shall in no case allow any dispute to delay the work under this Contract.
- C. As soon as practicable after the final submission of all information the GROUP shall make a determination of the dispute. Said decision of the GROUP shall be a condition precedent to any further action on the dispute. However, upon certification in writing by the claimant that the dispute has been submitted in this final form, the GROUP shall be obliged to render a decision on said dispute within sixty (60) days of the date of said certification. Should the GROUP fail to render its decision within the aforementioned sixty (60) day period, its decision will not be a condition precedent to any further action on the part of the claimant.
- D. Each decision by the GROUP will be in writing, and will be delivered to CONTRACTOR, by Federal Express/UPS or registered/certified mail, return receipt requested, at its last known address.
- E. In the event of an unfavorable decision by the GROUP, CONTRACTOR shall have the right to contest said decision as provided for under the provision of this Contract. CONTRACTOR shall notify the GROUP promptly that it intends to contest said decision, but agrees to proceed with the Work under protest.

GC-55. ARBITRATION AND LITIGATION

- A. Any controversy or claim arising out of or relating to this Contract, or the breach thereof, shall at the option of the GROUP be settled by arbitration in accordance with the Rules of the American Arbitration Association, and judgment upon the award rendered by the Arbitrator(s) may be entered in any Court having jurisdiction thereof.
- B. The GROUP will exercise its option to arbitrate concurrent with the rendering of its final decision on any claims submitted by CONTRACTOR. Should it fail to enter a final decision within the prescribed time or fail to exercise its option, said claims will be determined in accordance with the Rules of the American Arbitration Association as hereinafter stated.

GC-56. GOVERNING LAW

- A. Unless otherwise provided in the Contract Documents, this Contract and the Contract Documents shall be governed by the law of the State of New Jersey.

***** END OF SECTION *****

SECTION 00800

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions, as indicated below, amend or supplement the General Conditions and other provisions of the Contract Documents. All terms, conditions, covenants, requirements, and provisions, which are not so amended or supplemented, shall remain in full force and effect.

SC-1. NOTICE TO PROCEED/TIME FOR COMPLETION

- A. The Work for which CONTRACTOR is required to perform under this Contract shall commence at the time stipulated by the GROUP in its "Notice to Proceed" (NTP) to CONTRACTOR, and shall achieve Final Completion within two-hundred-eighty (280) consecutive calendar days following the commencement date stipulated in the NTP, or as subsequently modified in accordance with the Section 00700 of the Specifications.
- B. CONTRACTOR shall use its best efforts to complete the Work, as defined by the Contract Documents, within two-hundred-eighty (280) consecutive calendar days following the commencement date stipulated in the NTP to CONTRACTOR, but shall not be subject to liquidated damages or declared in default, if CONTRACTOR is unable to complete such work within this period, provided that such inability is not due to CONTRACTOR's default.
- C. Upon issuance of the NTP, CONTRACTOR will be bound to the performance of this Contract, and the GROUP shall issue its NTP to CONTRACTOR within fourteen (14) consecutive calendar days following execution of the Contract by the GROUP and CONTRACTOR.
- D. If CONTRACTOR is not given a NTP within fourteen (14) consecutive calendar days following execution of the Contract by the GROUP and CONTRACTOR, CONTRACTOR may elect to avoid this Contract by giving unequivocal and unconditional written notice of such avoidance to the GROUP. Such avoidance shall be effective upon actual receipt by the GROUP, prior to the mailing or actual delivery of any NTP, and CONTRACTOR's sole remedy shall be the avoidance of this Contract as set forth and the GROUP will not be liable to CONTRACTOR for any claims or losses including anticipated loss of profit and moneys expended in anticipation of performance under the Contract.
- E. Time is of the essence with regard to the time of completion and all other time limits herein, as stipulated in this Contract.

SC-2. LIQUIDATED DAMAGES

- A. Damages for any and all schedule delays (i.e., beyond the Contract specified completion date. See Supplementary Condition SC-1.) in completion of the Work, for which CONTRACTOR is required to perform under this Contract, shall be pursuant to the

penalties stipulated within the Consent Decree between the GROUP and USEPA for the OU-2 Final Remedy, dated September 30, 2004.

- B. Per the Consent Decree, CONTRACTOR and its Sureties shall be liable for and shall pay to the GROUP the following stipulated penalties for each calendar day of delay, as a result of and caused by CONTRACTOR's inability to complete the Work within the specified period, beyond the specified completion date (i.e., two-hundred-eighty [280] consecutive calendar days following the commencement date stipulated in the NTP), until such work is satisfactorily completed and accepted by the GROUP and USEPA:

| Penalty per Day | Period of delay |
|-----------------|---|
| \$500 | 1 st through 5 th day |
| \$1,000 | 6 th through 15 th day |
| \$3,000 | 16 th through 30 th day |
| \$5,000 | 31 st through 45 th day |
| \$7,500 | 46 th day and beyond |

- C. The length of time for USEPA review and approval of post-construction deliverables will not be allotted for enforcement of liquidated damages, so long as CONTRACTOR has completed all field work and has fully satisfied all submittal requirements within the allotted timeframe to the approval of the GROUP, GROUP's REPRESENTATIVE, and REMEDIAL DESIGNER.

SC-3. COMMUNICATIONS

- A. All notices, demands, inquiries, requests, instructions, approvals, proposals, and claims must be in writing.
- B. Any notice to demand upon CONTRACTOR shall be sufficiently given, if so delivered at the office of CONTRACTOR, as stated on the signature page of the Agreement (or at such other office as CONTRACTOR may from time to time designate), in a sealed, postage-prepaid envelope, prepaid Federal Express/UPS package, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.
- C. All papers required to be delivered to the GROUP shall, unless otherwise specified in writing to CONTRACTOR, be delivered to the 216 Paterson Plank Road Cooperating Group c/o Facility Coordinator, Golder Associates Inc., The National Newark Building, 744 Broad Street, 25th Floor, Suite 2500, Newark, New Jersey 07102. Any notice to or demand upon the GROUP shall be sufficiently given, if so delivered or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to Federal Express/UPS for delivery to the GROUP at such address, or delivered with charges prepaid to any telegraph company for transmission to said GROUP at such address, or to such other address as the GROUP may subsequently specify in writing to CONTRACTOR for such purpose.
- D. Any such notices shall be deemed given at the time of actual delivery/receipt, or (in case of mailing) when the same should have been received in due course of postal delivery,

or in the case of telegrams, at the time of actual receipt of such telegrams, as the case may be.

SC-4. CONTRACT DOCUMENTS AND DRAWINGS

- A. The GROUP will furnish CONTRACTOR without charge five (5) complete copies of the Contract Documents, including Technical Specifications, Construction Drawings, and Addenda. If CONTRACTOR elects to request additional copies, in part or whole, of the Contract Documents, said additional copies will be furnished to CONTRACTOR at cost.

SC-5. PARTIAL USE OF IMPROVEMENTS

- A. The GROUP, at its selection, may give written notice to CONTRACTOR and place in use those portions of the Work, which have been completed, inspected, and can be accepted as complying with the Contract Documents, and if in its opinion each such portion of the Work is reasonably safe, fit and convenient for use and accommodations for that it was intended, provided:
- 1) Use of such portions of the Work shall not materially impede the completion of the remaining portions of the Work by CONTRACTOR.
 - 2) CONTRACTOR shall not be responsible for any damages or maintenance costs due directly to the use of such portions of the Work.
 - 3) Use of such portions of the Work shall in no way relieve CONTRACTOR of its liability, due to use of defective materials or poor workmanship.
 - 4) Periods of guarantee, as stipulated in General Conditions GC-133, shall not begin to run until the date of final acceptance of all work for which CONTRACTOR is required to construct under this Contract.

SC-6. INSURANCE

The following will be the limits of insurance required for this Contract:

A. Commercial General Liability:

- 1) Personal Injury Liability Insurance will have limits of \$10,000,000 (per occurrence)/\$10,000,000 (aggregate), said limits to apply also during periods when completed operations clauses are in effect.
- 2) Property Damage Liability Insurance will have limits of \$10,000,000 (per occurrence)/\$10,000,000 (aggregate), said limits to apply also during periods when completed operations clauses are in effect.

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B. Automotive Liability:

- 1) Personal Injury Liability Insurance will have limits of \$5,000,000 (per person)/\$5,000,000 (per occurrence).
- 2) Property Damage Liability Insurance will have limits of \$5,000,000 (per occurrence).

C. CONTRACTOR's Pollution Liability:

- 1) Aggregate limit = \$5,000,000 (per occurrence).
- 2) Each occurrence limit = \$5,000,000.

D. Pollution Legal Liability:

- 1) Aggregate limit = \$5,000,000 (per occurrence).
- 2) Each occurrence limit = \$5,000,000.

E. Workman's Compensation Insurance:

- 1) CONTRACTOR shall carry workman's compensation insurance in accordance with State of New Jersey statutory requirements.

SC-7. LAYOUT OF WORK

- A. CONTRACTOR shall perform all layout work necessary for the satisfactory execution and completion of the Work, as shown on the Contract Drawings, and all costs in connection therewith shall be included in the contract price(s), as stipulated in Sections 00300 and 01025 of the Specifications.
- B. CONTRACTOR shall employ competent personnel, and all work shall be subject to the review, approval, acceptance, and oversight of the GROUP's REPRESENTATIVE, REMEDIAL DESIGNER, and QUALITY ASSURANCE OFFICE.
- C. CONTRACTOR shall be held responsible for protecting and safeguarding all survey control points and benchmarks established by CONTRACTOR or by others. Any replacement or re-establishment of any survey control points or benchmarks shall be at CONTRACTOR own expense, and CONTRACTOR shall not be allowed to submit any indirect or direct requests to the GROUP for reimbursement of said expenses/costs.

SC-8. "OR EQUAL" CLAUSE

- A. Unless specified otherwise in the Contract Document, the term "Or Equal" and/or "Or Equivalent" shall mean the following:
 - 1) Whenever a material, article, product, or piece of equipment is identified on the Contract Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., the intent is to establish a standard. Any material, article, product, or equipment of other manufacturer or

vendor of equal or higher quality (particularly with regard to points specified in the specifications), which will perform equivalently within the design ranges specified, will be equally acceptable provided that the material, article, product, or equipment so proposed is, in the opinion of the REMEDIAL DESIGNER, of equal substance and function. Further, the manufacturer must agree to comply fully with the warranty requirements of the Specifications.

- 2) CONTRACTOR shall not assume substitute materials, articles, products, or equipment will be approved by the REMEDIAL DESIGNER, and non-approval of said materials, articles, products, or equipment will form no basis for a claim for additional compensation by CONTRACTOR without the REMEDIAL DESIGNER's written approval. If the REMEDIAL DESIGNER's approval is obtained for alternate materials, articles, products, or equipment, CONTRACTOR shall, at its own expense, make any necessary changes to the Work specified in the Contract Documents, and if additional engineering services are required or incurred by the REMEDIAL DESIGNER, due to substitution of any alternate materials, articles, products, and/or equipment, CONTRACTOR shall reimburse the GROUP for all engineering services rendered by the REMEDIAL DESIGNER in connection the substitution of said alternate materials, articles, products, and/or equipment.

SC-9. INTEREST OF MEMBERS, OFFICERS, OR EMPLOYEES OF THE GROUP, MEMBERS OF LOCAL GOVERNING BODY, OR OTHER PUBLIC OFFICIALS

- A. No member, officer, or employee of the GROUP, or its designees or agents, no member of the governing body of the locality in which the project is situated, and no other public officials of such locality or localities who exercise any functions or responsibilities with respect to the program during his/her tenure or for one (1) year thereafter, shall have any interest, direct or indirect, in any Contract or Subcontract, or the proceeds of thereof, for the Work to be performed by CONTRACTOR under this Contract.

SC-10. MAINTENANCE AND PROTECTION OF TRAFFIC

- A. During performance of this Contract, CONTRACTOR shall maintain properly regulated and controlled pedestrian and vehicular traffic flows at all times. CONTRACTOR shall make every effort to prevent delays and unnecessary inconveniences to the public throughout the life of this Contract.
- B. Should CONTRACTOR anticipate and/or encounter difficulties, obstacles, lack of cooperation from "others", etc., which might encumber the Maintenance and Protection of Traffic for which CONTRACTOR is responsible under this Contract, CONTRACTOR shall immediately contact the following parties, as appropriate and applicable:
 - 1) Fire Department;
 - 2) Police Department;
 - 3) Department of Public Works;
 - 4) Traffic Department;
 - 5) Office of the State Department of Transportation; and

6) The GROUP, its REPRESENTATIVES, and the REMEDIAL DESIGNER.

- C. It shall be CONTRACTOR's responsibility to see that pedestrian and vehicular traffic flows are maintained at all times, with minimal interruptions throughout the Contract area and during the entire Contract period.
- D. CONTRACTOR shall also be required, at all times, to maintain pedestrian and vehicular access to all businesses and private establishments within the vicinity of the Site. CONTRACTOR shall also protect the pedestrian traffic against accident and/or injuries that might arise/occur within the areas of the Work, as specified in this Contract.
- E. All direct labor and expenses incidental to the Maintenance and Protection of Traffic, in connection with the Work specified in this Contract, will not be measured for payment. Hence, said direct labor and expenses shall be incorporated into the unit bid prices for the various items included in this Contract, as presented and defined in Section 00300 and 01025 of the Specifications.
- F. See Section 01550 of Specifications for additional Site Access and Traffic Control requirements.

SC-11. WORK IN THE VICINITY OF EXISTING FACILITIES

- A. CONTRACTOR shall be responsible for coordinating its prosecution of the Work with utility companies having overhead or underground services within the limits of work. CONTRACTOR shall notify the respective utility companies of services, mains, ducts, and poles, which must be relocated, capped, extended, or supported, at least fourteen (14) days before the Work is required.
- B. No payment will be made for such coordination, relocation, or support, and said costs shall be included in the unit bid item cost of the various items of Work under this Contract. See Sections 00300 and 01025 of the Specifications.

SC-12. NIGHT WORK

- A. "Night work" will only be permitted upon obtaining any necessary permits and the approval of the GROUP's REPRESENTATIVE. If night work is permitted, CONTRACTOR shall provide seventy-two (72) hour advance notice of its intent to schedule "Night work" to the GROUP's REPRESENTATIVE.

SC-13. HOURS OF OPERATION

- A. CONTRACTOR and its SUBCONTRACTORS shall not be allowed to perform any Work on-Site without the full-time, on-Site presence of the GROUP's REPRESENTATIVE and/or the REMEDIAL ENGINEER.
- B. CONTRACTOR will limit its working hours from 7:00AM to 5:00PM on Mondays through Saturdays, unless local zoning ordinances demand otherwise. If

CONTRACTOR intends to work on any given Saturday, it shall notify and provide twenty-four (24) hour advance notice to the GROUP's REPRESENTATIVE.

SC-14. EXECUTION OF AGREEMENT

- A. Within ten (10) consecutive calendar days of Notice of Award (NOA), the successful CONTRACTOR shall sign and deliver to the GROUP's REPRESENTATIVE, an Agreement in the form included in the Contract Documents, in such number of copies as the GROUP may require.
- B. If CONTRACTOR has any questions in connection to or wishes to make changes to this Agreement, CONTRACTOR shall submit, within ten (10) days following the NOA, all appropriate requests for clarification to the GROUP's REPRESENTATIVE for review and respond to said requests. In addition, CONTRACTOR may elect to request that Contract negotiation meetings be convened to expedite the Contract review and to establish mutually acceptable Contract terms and conditions.
- C. Upon establishment of mutually (i.e., between the GROUP and CONTRACTOR) acceptable Contract terms and conditions, CONTRACTOR shall sign and deliver to the GROUP's REPRESENTATIVE, an Agreement in the form included in the Contract Documents and modified accordingly in mutual agreement of both parties entering into such Agreement, in such number of copies as the GROUP may require.
- D. Upon receipt of the signed and dated Agreement, the GROUP shall countersign said Agreement, and issue its NTP to CONTRACTOR within fourteen (14) consecutive calendar days following execution of the Contract by the GROUP and CONTRACTOR.
- E. If CONTRACTOR is not given a NTP within fourteen (14) consecutive calendar days following execution of the Contract, CONTRACTOR may elect to avoid this Contract by giving unequivocal and unconditional written notice of such avoidance to the GROUP. Such avoidance shall be effective upon actual receipt by the GROUP, prior to the mailing or actual delivery of any NTP, and CONTRACTOR's sole remedy shall be the avoidance of this Contract as set forth and the GROUP will not be liable to CONTRACTOR for any claims or losses including anticipated loss of profit and moneys expended in anticipation of performance under the Contract.

SC-15. PERFORMANCE BOND, LABOR, AND MATERIAL PAYMENT BOND

- A. Having satisfied all conditions of award, as set forth elsewhere in these Documents, the successful CONTRACTOR shall, within fourteen (14) consecutive calendar days following its receipt of the GROUP's NTP, furnish a Performance Bond in a penal sum of not less than one-hundred-percent (100%) and a Labor and Material Payment bond in a penal sum of not less than one-hundred-percent (100%) of the Contract total amount, as awarded, as security for the faithful performance of the Work specified by this Contract, and for the payment of all persons, firms, or corporations to whom CONTRACTOR may become legally indebted for labor, materials, tools, equipment, or services of any nature. Such bonds shall be in the same form as that included in the Contract Documents and shall bear the same date as or a date subsequent to that of the

Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bonds. These bonds shall be signed by a Guaranty or Surety Company listed in the latest issue of the U.S. Treasury Circular 570 and the penal sum shall be within the maximum specified for such Company in said Circular 570.

- B. Notwithstanding the foregoing, all bonds required by law shall be in accordance with the form and substance so required by law.
- C. Failure of the successful Bidder to execute such Agreement and to supply the required bonds within fourteen (14) consecutive calendar days of the GROUP NTP, or within such extended period as the GROUP may grant, based upon reasons determined sufficient by the GROUP, shall constitute a default.

SC-16. PRE-AWARD MEETING

- A. At the option of the GROUP, and without additional expense to the GROUP, a pre-award conference may be scheduled, provided one (1) week's advance notice of the time and place of the same shall be given to CONTRACTOR.

SC-17. PROTECTION OF EXISTING SLURRY AND SHEET PILE WALL SYSTEMS

- A. Given the critical nature and general instability of the existing steel sheet pile wall system along Peach Island Creek, CONTRACTOR shall take all appropriate precautions, as it deems necessary, to protect the existing steel sheet pile wall system and prevent any induced lateral and/or rotational movements of this wall, under any applied construction material and equipment loads.
- B. CONTRACTOR shall not be allowed to position any construction material or equipment loads within a forty (40) feet horizontal offset area behind the existing steel sheet pile wall, as measured from the top of the wall, unless specifically directed or approved otherwise by the REMEDIAL DESIGNER.
- C. CONTRACTOR shall be responsible for maintaining the integrity of the existing perimeter slurry wall system, and shall take all appropriate precautions, it deems necessary, to protect said slurry wall system. If the integrity of the existing perimeter slurry wall system is compromised, due to CONTRACTOR's actions or any Work performed under this Contract Agreement, CONTRACTOR shall repair and/or replace, at its own cost, said impacted slurry wall sections in kind and to acceptance of the REMEDIAL DESIGNER.

***** END OF SECTION *****

SECTION 01015

DEFINITIONS

PART 1 – GENERAL

1.01 PARTICIPANTS

- A. USEPA: The word “USEPA” means the US Environmental Protection Agency, Region II, 290 Broadway, New York, NY 10007-1866.
- B. NJDEP: The word “NJDEP” means the New Jersey Department of Environmental Protection, 401 East State Street, 5th Floor, CN 028 Trenton, NJ 08625.
- C. GROUP: The word “GROUP” means the 216 Paterson Plank Road Cooperating PRP Group.
- D. GROUP’s REPRESENTATIVE: The words “GROUP’s REPRESENTATIVE” or “GROUP’s REPRESENTATIVES” mean a representative or representatives of the 216 Paterson Plank Road Cooperating PRP Group, as identified in the Contract Agreement.
- E. CONTRACTOR: The word “CONTRACTOR” means the individual, partnership, firm, corporation or any combination thereof, including SUBCONTRACTORS, contracting with the GROUP for work covered by these Specifications.
- F. REMEDIAL DESIGNER: The words “REMEDIAL DESIGNER” mean Golder Associates Inc., 200 Century Parkway, Suite C, Mt. laurel, New Jersey, 08054 and/or 744 Broad Street, 25th floor, Suite 2500, Newark, New Jersey, 07102.
- G. QUALITY ASSURANCE OFFICIAL OR OFFICER (QAO): The words “QUALITY ASSURANCE OFFICER” or “QUALITY ASSURANCE OFFICE” are to be determined.
- H. SUBCONTRACTOR: The word “SUBCONTRACTOR” means the individual, partnership, firm, corporation or any combination thereof, contracting with the CONTRACTOR for work covered by these Specifications.
- I. MANUFACTURER: The word “MANUFACTURER” means the individual, partnership, firm, corporation or any combination thereof, which produces or supplies materials used to complete the Work.

1.02 CONTRACT DEFINITIONS

- A. Addenda: Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Documents or the Contract Documents.

- B. Application for Payment: The form accepted by the GROUP's REPRESENTATIVE which is to be used by the CONTRACTOR in requesting progress or final payments, and which is to include such supporting documentation as required by the Contract Documents.
- C. Bidding Documents: Include, but may not be limited to, the Invitation/Instructions to Bidders, Information Available to Bidders, Bid Submittal Letter, Bid Forms, Construction Agreement, Specifications, Contract Drawings, and the "Contract Documents" (including all Addenda issued prior to receipt of Bids).
- D. Bid: A document submitted by an interested party in response to the GROUP's request for proposal which includes the proposed methods, schedule, and costs for the interested party to perform the Work.
- E. Bonds: Bid, performance and payment bonds, and other instruments of security.
- F. Change Order: A document required by the GROUP's REPRESENTATIVE, which is signed by the CONTRACTOR and the GROUP authorizing an addition, deletion or revision in the Work, and/or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.
- G. Competent Person: The words "Competent Person" mean an individual provided by the CONTRACTOR, and approved by GROUP or GROUP's REPRESENTATIVE, who is qualified and experienced to implement, supervise, and inspect the Work.
- H. Commencement Date: The commencement date shall be stipulated in the Notice to Proceed, and this date shall coincide with the first, initial day made available to CONTRACTOR for commencement of its mobilization activities on-Site.
- I. Construction Drawings/Contract Drawings: The drawings issued for construction which show the character and scope of the Work to be performed, which have been prepared or approved by the REMEDIAL DESIGNER, and which are included in the Contract Documents. See Section 00210 of Specifications for a List of Contract Drawings.
- J. Contract Documents: The Contract Documents include Specifications, all Addenda, the Agreement, General and Supplemental Conditions, Bid, and Contract Drawings.
- K. Contract Price: The amount payable by the GROUP to the CONTRACTOR under the Contract Documents. Minor changes to the Contract Price (\$10,000 or less) may be approved by the GROUP's REPRESENTATIVE.
- L. Contract Time: The number of days or the time period stated in the Form of Agreement for completion of the Work. The GROUP's REPRESENTATIVE may approve minor changes to the Contract Time (14 days or less), as long as the total number of days beyond the contract does not exceed thirty (30) days. Major schedule changes; i.e. greater than fourteen (14) days for a single task and greater than thirty (30) days for all tasks, must be approved by the GROUP.

- M. Defective Work: Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the GROUP's REPRESENTATIVE's recommendation of final payment (unless responsibility for the protection thereof has been assumed by GROUP at Substantial Completion).
- N. Deficiency: An element of completed work which has been identified as Defective.
- O. Field Order: A written order issued by the REMEDIAL DESIGNER that orders minor changes in the Work but does not involve changes in the Contract Price nor the Contract Time, and does not require approval by the GROUP's REPRESENTATIVE.
- P. Final Completion: The GROUP will make a final inspection with CONTRACTOR and GROUP's REPRESENTATIVE, and will sign the Certificate of Final Completion, if Work is complete, or will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.
- Q. Form of Agreement: A legal contract between the CONTRACTOR and the GROUP which includes, but is not limited to the Contract Price and Contract Time for the Work.
- R. General Specifications: Sections contained in Division 1 of the Specifications.
- S. Install: Provide and install, unless otherwise noted.
- T. Installer: The word "Installer" means the individual, partnership, firm, corporation, or any combination thereof, contracting with the CONTRACTOR for work covered by these Specifications.
- U. Laws and Regulations/Laws or Regulations: Laws, rules, regulations, ordinances, codes, and/or orders of any governmental entity having jurisdiction over the Work. The State of New Jersey shall be the jurisdiction for any and all disputes.
- V. Notice of Award: The written notice by the GROUP to the apparent successful Bidder stating that, upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein and, within the time specified, the GROUP will sign and deliver the Agreement.
- W. Notice to Proceed: A written notice given by the GROUP's REPRESENTATIVE to the CONTRACTOR fixing the date on which the Contract Time will commence to run, and on which the CONTRACTOR shall start to perform the CONTRACTOR's obligations under the Contract Documents.
- X. Products: The term "material" or "products" shall include products, equipment, assembly methods, manufacturer, brand, trade name, or other description. References to "equivalent," "approved equivalent," or similar terms mean that

approval from the REMEDIAL DESIGNER is required. All materials shall be new and specifically purchased for the Work under this Contract, unless as otherwise accepted by the GROUP's REPRESENTATIVE or specified in the Contract Documents. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

- Y. Provide or Provided: Means “furnish and install” to the satisfaction of the GROUP's REPRESENTATIVE.
- Z. Quality Assurance (QA): Means measures taken by the GROUP's REPRESENTATIVE through the QAO to independently assess if the contractor is in compliance with the Contract Documents for the project.
- AA. Quality Control (QC): Means measures taken by the CONTRACTOR to determine compliance with the requirements for materials and workmanship as stated in the Contract Documents.
- BB. Record Documents: A complete set of Contract Documents marked such that any field changes are readily identified. These Record Documents shall be maintained by the CONTRACTOR on-Site, and upon Contract completion, shall be sealed and provided to the GROUP.
- CC. Referenced Standard: A recognized standard, which is identified in a Specification and incorporated by reference.
- DD. Schedule of Values: The CONTRACTOR's itemized listing of activities of the Work, set forth, in a form acceptable to the GROUP's REPRESENTATIVE, which describes the CONTRACTOR's allocation of the Contract Price by activity. These same activities shall be identical to those listed in the CONTRACTOR's progress schedule.
- EE. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of the Work; and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a Supplier, and submitted by the CONTRACTOR to illustrate material or equipment for some portion of the Work, and that must be maintained on-site.
- FF. Substantial Completion: The Work (or a specified part thereof) has progressed to the point where, in the opinion of the GROUP's REPRESENTATIVE as evidenced by the GROUP's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that final payment is due. The terms “substantially complete” and “substantially completed” as applied to any Work refer to Substantial Completion thereof.
- GG. Successful Bidder: The Bidder to whom the GROUP makes an award.
- HH. Supplier: A manufacturer, fabricator, distributor, material man, or vendor.
- II. Technical Specifications/Specifications: Those portions of the Bidding Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

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- JJ. Transportation and Handling: All material shall be shipped, delivered, and stored in the manufacturer's undamaged crating and packaging, except as otherwise approved by the REMEDIAL DESIGNER. All materials shall be protected and stored off the ground on blocking, or pallets, and shall be covered as appropriate. All material shall be protected from damage due to weather, vandalism, etc.
- KK. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, as required by the Contract Documents.
- LL. Workday: Any calendar day that CONTRACTOR performs actual, productive Work at the Site between the designated "Hours of Operation" (i.e., Mondays through Saturdays between the hours of 7:00AM and 5:00PM), as stipulated in Supplementary Condition SC-13 (see Section 00800 of the Specification).

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

***** END OF SECTION *****

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 GENERAL

- A. Furnish all labor, materials, tools, equipment, and appurtenances required to measure the quantity of the Work completed by CONTRACTOR, as specified in the Contract Documents.
- B. This Section establishes the payment criteria applicable to those designated portions of the Work performed under stipulated “unit price” and “lump sum” payment methods.
- C. This section also establishes defect assessment and non-payment criteria for any and all rejected Work, in the opinion of the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER, due to CONTRACTOR’s non-compliance with the Contract Documents.
- D. Applications for Payment shall be in accordance with the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 00300 – Bid Forms
- B. Section 00700 – General Conditions
- C. Section 00800 – Supplementary Conditions
- D. Section 01050 – Field Engineering and Surveying
- E. Section 01300 – Submittals
- F. Section 01700 – Contract Closeout
- G. Section 01720 – Record Documents

1.03 AUTHORITY

- A. Measurement methods delineated in this Section are intended to compliment the criteria presented within the individual Sections of the Specifications. In the event of conflict, the requirements of the individual Specification Sections shall govern.
- B. CONTRACTOR shall be solely responsible for taking all measurements, where and as required, computing all payment quantities, and providing all supporting documentation, as required or warranted, for each Bid Item included in/with each Application for Payment. The GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER will verify all items, measurements, and quantities.

- C. CONTRACTOR shall assist in verifying quantities by providing any and all necessary equipment, workers, and survey personnel, as required and requested by the GROUP's REPRESENTATIVE or the REMEDIAL DESIGNER.

1.04 UNIT QUANTITIES SPECIFIED

- A. Quantities and measurements indicated in the Bid Forms (i.e., Exhibits "A" and "B" to Section 00300 of these Specifications) are for bidding and Contract purposes only. Actual in-place quantities and measurements supplied by CONTRACTOR and verified by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER shall determine actual payment quantities and amounts.
- B. If CONTRACTOR believes the Work will require more or fewer quantities than those quantities indicated in the Bid Forms, it shall provide its estimated quantities to complete the Work at the unit prices listed in the Bid Forms or as defined under subsequent modifications to the Contract Documents.

1.05 MEASUREMENT OF QUANTITIES

- A. Measurement Devices:
 - 1. Weigh Scales: Inspected, tested, and certified by the State of New Jersey Weights and Measures Department within the past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicles.
 - 3. Metering Devices: Inspected, tested, and certified by the State of New Jersey within the past year.
- B. Measurement by Weight: Measurements of quantities expressed in weight units shall be based upon actual measured weights, utilizing measurement devices deemed acceptable and approved by the GROUP's REPRESENTATIVE.
 - 1. Concrete reinforcing steel, rolled, or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weights.
- C. Measurement by Volume: Measurement of quantities expressed in volume units shall be based upon in-place, neat plan line projections of the Work limits, as determined by field survey record drawings, for each item with no additional allowances for shrinkage, swelling, or creep.
 - 1. In computing volumes of excavation and fill, "average end-area" or equivalent methods, deemed acceptable and approved by the GROUP's REPRESENTATIVE, shall be used.

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- D. Measurement by Area: Measurement of quantities expressed in area units shall be based upon horizontal, planimetric projections of the Work limits, as determined by field survey record drawings, for each item with no additional allowances for slopes.
- E. Measurement by Horizontal Linear Units: Measurement of quantities expressed in horizontal linear units, such as piping and conduits, shall be based upon field surveyed stations recorded along straight or curved centerline projections for each respective item.
- F. Measurement by Vertical Linear Units: Measurement of quantities expressed in vertical linear units, such as wells, piezometers, etc., shall be based upon field surveyed soundings of the bottoms of each installed borehole, well, or piezometer measured relative to ground surface for each respective item.
- G. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear units/means or any combination thereof, as appropriate, as a completed item or unit of the Work.

1.06 PAYMENT

- A. Payment for each “lump sum” and “unit price” Bid Items, as stated in the itemized Bid Forms (i.e., Exhibits “A” and “B” to Section 00300 of the Specifications), shall constitute complete, full compensation for all required labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application, or installation of an item of the Work required to complete all work specified under that particular item, including cleanup.
 - 1. The price bid for each “lump sum” and “unit price” stated in the itemized Bid Forms shall be deemed to include allowances for CONTRACTOR’S overhead and profit.
 - 2. Reference to relevant Sections of the Specifications is provided to facilitate pricing. However, CONTRACTOR shall, using its own judgment, determine those Sections of the Specifications that are relevant to each pay item, prior to submitting its comprehensive price to cover all Work identified and specified in the Contract Documents.
 - 3. Each “lump sum” and “unit price” stated in the itemized Bid Forms shall include, except where explicitly stated otherwise, all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent, including, but not limited to, cleaning up, Site security, emissions control, odor control, duct control, decontamination, health and safety, quality control, and traffic control.
 - 4. Payment of all Bid Items, as stated in the itemized Bid Forms, will be made in accordance with the Contract Agreement, and only after verification by the GROUP’S REPRESENTATIVE and/or the REMEDIAL DESIGNER.

5. Retainage shall be held on all payments, in accordance with the requirements stipulated in the Contract Agreement.
- B. For “in-progress” payments, placement documentation shall include, but not limited to, daily field reports prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE, delivery invoices, scale house measurements, field measurements utilizing measuring tapes or wheels, etc. Equipment and methods of material-placement documentation for “in-progress” payments shall be deemed acceptable to the GROUP’s REPRESENTATIVE.
- C. Payment for Work shall be made on the basis of actual measurements and quantities, reviewed, verified, and accepted by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER, multiplied by the unit prices for the Work, as state in the Bid Forms, that is incorporated into, or made necessary by, the Work. For payment, record documentation shall include, but not be limited to, actual field surveys by Professional Land Surveyors licensed and registered in the State of New Jersey.
- D. Payment will be made to the Contract limits, as specified in the Contract Documents. If the constructed limits are less than the specified limits, payment will be made to the actual limits of construction, as shown on the Record Drawings. Payment for quantities that exceed the specified Contract limits will only be made with the approval of the GROUP’s REPRESENTATIVE. Payment for quantities that exceed the Contract quantities, as stipulated in the Bid Forms, shall only be obtained through approved Change Order(s), which must be issued before the Contract quantities are exceeded.
- E. No partial payments shall be made for the installation of items, which have not been tested and approved.
- F. No piping or conduits shall be backfilled prior to completion of all necessary field surveys to document final “as-built” conditions. If CONTRACTOR backfills any excavations before completion of all necessary field surveys, CONTRACTOR will be required to re-excavate said areas to facilitate and complete the necessary field surveys, and CONTRACTOR shall not be compensated for said re-excavation costs by the GROUP.
- G. Partial payment will be made for materials delivered to the Site (exclusive of fill materials), and adequately stored and protected until installation. Partial payments for delivered materials will only be made for items that CONTRACTOR intends to use within ninety (90) days of delivery, unless otherwise approved by the GROUP’s REPRESENTATIVE. Materials will be paid for at direct cost plus shipping, upon presentation of a valid receipt, bill, or invoice with the payment request. All such requests must have material quantities verified by the GROUP’s REPRESENTATIVE, prior to payment. CONTRACTOR shall protect all delivered materials, as outlined by the manufacturer while being stored at Site, and shall replace all damaged materials at no cost to the GROUP. No partial payment will be made for materials

delivered to the Site for which the receipt, bill, or invoice is less than five-hundred-dollars (\$500).

- H. Upon installation, the “unit cost” for the item will be paid less any prior partial payments for stored material. Upon installation, an adjustment will be made in payment to account for the quantity of materials actually installed in the Work. The GROUP will not pay for any materials in excess of what is actually installed in the Work.
- I. Payment for “unit price” items (all items except “lump sum” items) will be made monthly until completion of each “unit price” item, based on quantities estimated by CONTRACTOR, and verified by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER. Final payment will be based on actual quantities established/calculated by CONTRACTOR from the Record Drawings, less any partial payments paid by the GROUP for each Bid Item.

1.07 VARIATIONS IN QUANTITIES AND PRICES

- A. Quantities stipulated in the Bid Forms represent only approximate values, and are provided as a basis for the uniform comparison of submitted Bid Proposals, and the GROUP and the GROUP’s REPRESENTATIVE does not expressly or by implication agree that actual amounts of Work will correspond therewith.
- B. CONTRACTOR must provide, for “unit price” Work, a proposed Contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed, and are solely for the purpose of comparing Bids. Each such “unit price” will be deemed to include an amount for overhead, profit, and any indirect costs for each separately defined Bid Item.
- C. An increase or decrease in the quantity for any “unit price” item, as stipulated in the Bid Forms” shall not be regarded as sufficient grounds for an increase or decrease in the “unit price” of the items except as provided herein.
- D. With the exception of Bid Items No. 9, 15, 16, 29, and 29-A, if the quantity of a “unit price” Bid Item, as stipulated in the Bid Forms, in this Contract is an estimated quantity and the actual quantity of this “unit price” Bid Item varies by more than twenty-five (25) percent above or below the estimated quantity, or above or below twenty-five (25) percent of the sum of quantities for “unit price” work where two sub-items are listed, and the total variance in price of the “unit price” Bid Item would result in a variance equal to or more than ten (10) percent of the Contract base price, an equitable adjustment to the Contract price may be made upon demand of either party, provided “Part 3 – BASE CONTRACT PAYMENT ITEMS” of this Specification Section does not include any specific Contract language to the contrary for each individual Bid Item. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variations below seventy (75) percent of the estimated quantity or above one-hundred-twenty-five (125) percent of the estimated quantity, or sum of quantities for “unit price” Work where two sub-items are listed.

- E. If any Bid Item quantity variations are such as to cause an increase in the time, relative to the duration of Work stated in Contractor's Baseline Construction Progress Schedule, necessary for completion, CONTRACTOR may request, in writing, an extension of time, to be received by the GROUP's REPRESENTATIVE within ten (10) working days of any realized Bid Item quantity variations, or within such further period as may be granted by the GROUP's REPRESENTATIVE before the date of final settlement of the Contract. Upon the receipt of a written request for a time extension from CONTRACTOR, the GROUP's REPRESENTATIVE shall ascertain the facts and make all appropriate adjustments for extending the Contract completion date, provided the GROUP's REPRESENTATIVE deems said request for a time extension is justified.

1.08 DEFECT ASSESSMENT

- A. Replace all Work, or portions thereof, not conforming to or in compliance with the Contract Documents at CONTRACTOR's sole expense.
- B. If, in the opinion of the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, it is not practical to remove and replace the Work, the GROUP's REPRESENTATIVE will direct one of the following remedies:
 - 1. Remove and replace the defective Work, at CONTRACTOR's sole expense;
 - 2. The defective Work may remain, but an equitable adjustment will be made by the GROUP's REPRESENTATIVE to the "lump sum" or "unit price" for the associated Bid Item; or
 - 3. The defective Work will be partially repaired to the satisfaction of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER, and an adjustment will be made by the GROUP's REPRESENTATIVE to the "lump sum" or "unit price" for the associated Bid Item to reflect the defective Work.
- C. The individual Specification Sections may modify these options or may identify specific formula or percentages of "lump sum" and/or "unit price" reductions for such defective Work.
- D. The authority of the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER to assess defective Work and identify payment adjustment, if applicable, is final.

1.09 NON-PAYMENT FOR REJECTED PRODUCTS

- A. Payment will not be made for any Bid Items not in compliance with the Contract Documents including, but not necessarily limited to, the following:

1. Products wasted or disposed of in a manner that is not acceptable;
2. Products determined as unacceptable before or after placement;
3. Products not completely unloaded from the transporting vehicle;
4. Products placed beyond the lines and levels of the required Work;
5. Products remaining on hand after completion of the Work;
6. Loading, hauling and disposing of rejected Products; and
7. Materials that may be lost or stolen from the project Site.

PART 2 – PRODUCTS

Not used.

PART 3 – BASE CONTRACT PAYMENT ITEMS

3.01 BID ITEM NO. 1: MOBILIZATION/DEMobilIZATION (LUMP SUM)

A. Measurement:

1. The Work required for this bid item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all engineering, submittal, and work plan development leading up to initiation of field construction activities; mobilization and demobilization of all labor, owned and rented equipment, and materials to and from the Site; CONTRACTOR-provided utilities and temporary facilities; insurance; on-going related expenses considered normal for administration of the Work; and all other requirements of the Work not covered in other Bid Items. Initial development of items required for job execution shall be considered part of this Bid Item including, but not limited to, preparation of the Baseline Construction Progress Schedules, initial construction photographs and video, additional subsurface investigations, temporary modifications to existing fences, establishment of staging and parking areas, procurement of temporary service contracts (i.e., electric, telephone, water, sewer), and location of existing Site features (e.g., utilities) in accordance with the requirements of the Contract Documents.
2. Payment, less applicable retainage, for this item shall also include full compensation for the preparation of initial written plans and submittals, cost items generally associated with Division 1 of the Specifications, excluding the Health and Safety Plan (HASp), which is compensated under Bid Item No. 5 and the Soil Erosion and Sedimentation Control Plan, which is compensated under Bid Item No. 6, permit applications not explicitly covered under other Bid Items, and incidentals to the Work not directly associated with the other Bid Items.

3. Twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's first/initial payment request following mobilization of sufficient labor, equipment, and materials to progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price, until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's final payment request, submitted in accordance with the Contract.
4. The total price paid for this Bid Item shall not exceed six (6) percent of the original total Contract amount/value.

3.02 BID ITEM NO. 2: SURVEYING AND FIELD ENGINEERING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and materials associated with staking, construction surveying, surveys for measurement and payment, and preparation and maintenance of the require record "as-built" drawings and supporting documentation, in accordance with the requirements of the Contract Documents.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.03 BID ITEM NO. 3: PERFORMANCE BOND (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for supplying a performance bond in accordance with the Contract Documents.
2. Payment of this lump sum Bid Item shall be in full, less applicable retainage, with CONTRACTOR's initial payment request.

3.04 BID ITEM NO. 4: PAYMENT BOND (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for supplying a payment bond in accordance with the Contract Documents.
2. Payment of this lump sum Bid Item shall be in full, less applicable retainage, with CONTRACTOR's initial payment request.

3.05 BID ITEM NO. 5: HEALTH AND SAFETY & AIR MONITORING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and materials necessary to provide all appropriate and qualified health and safety and air monitoring personnel, equipment, and supplies to prepare and implement CONTRACTOR's Site-specific Health and Safety Plan (HASP), which shall be submitted to and not disapproved by the REMEDIAL DESIGNER and GROUP's REPRESENTATIVE, in accordance with the requirements of the Contract Documents.
2. Twenty-five (25) percent of the lump sum price bid will be paid, less applicable retainage, with CONTRACTOR's first/initial payment request, provided it has submitted and received approval of its Site-specific HASP and satisfactory evidence of mobilization of sufficient labor, equipment, and material to adequately progress the Work of this Contract. Five (5) percent of the lump sum price bid, less applicable retainage, will be paid with each of CONTRACTOR's 2nd through 11th

payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be paid with CONTRACTOR's final payment request, as submitted in accordance with the Contract.

3. No material payments will be granted for this Bid Item.

3.06 BID ITEM NO. 6: SOIL EROSION AND SEDIMENT CONTROL (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to furnish, install, maintain, and remove, as required by the Contract Documents and/or directed by the GROUP's REPRESENTATIVE and/or REMEDIAL DESIGNER, temporary and permanent erosion and sedimentation control measures including, but not limited to, erosion control matting, silt fencing, diversion berms/channels, seeding, and sedimentation traps, as required by CONTRACTOR's Site Erosion and Sedimentation Control Plan and as deemed necessary by the GROUP's REPRESENTATIVE, the REMEDIAL DESIGNER, and/or the QUALITY ASSURANCE OFFICER (QAO) to control erosion and sedimentation during construction activities, in accordance with the requirements of the Contract Documents.
2. The lump sum price for this Bid Item shall also include all costs incurred by CONTRACTOR to prepare its Site-specific Soil Erosion and Sedimentation Control Plan, which shall outline and describe CONTRACTOR's construction sequencing and corresponding soil erosion and sedimentation control measures to be implemented by the CONTRACTOR during its construction efforts, in accordance with the requirements of the Contract Documents.
3. Twenty-five (25) percent of the lump sum price bid will be paid, less applicable retainage, with CONTRACTOR's first/initial payment request, provided it has submitted and received approval of its Soil Erosion and Sedimentation Control Plan and satisfactory evidence of mobilization of sufficient labor, equipment, and material to adequately progress the Work of this Contract. Five (5) percent of the lump sum price bid will be paid, less applicable retainage, with each of CONTRACTOR's 2nd through 11th payment requests for this Bid Item. No additional partial payments will be made over seventy-five (75) percent of the lump sum price until the final payment request. The remaining twenty-five (25) percent of the lump sum price bid will be

paid with CONTRACTOR's final payment request, as submitted in accordance with the Contract.

4. No material payments will be granted for this Bid Item.

3.07 BID ITEM NO. 7: CLEARING AND GRUBBING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all clearing, grubbing, handling, chipping, loading, hauling, and disposing or composting of all existing vegetative materials and surface debris to prepare areas to receive the proposed new soil cover system, perimeter drainage channels, access roads within the limits of disturbance, as shown on the Contract Drawings. Off-site disposal of cleared and grubbed materials shall be at a facility approved by the GROUP's REPRESENTATIVE.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.08 BID ITEM NO. 8: REMOVE EXISTING GEOMEMBRANE AND SUBGRADE PREPARATION (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor and equipment to: a) sequentially and systematically remove and dispose off-Site the existing 60-mil geomembrane, and its underlying non-woven geotextile cushioning layer; b) drain, remove, and dispose off-Site the existing geomembrane weighting system; c) perform all subgrade preparation activities, excluding the import, placement, and compaction of grading fill, which shall be compensated under Bid Item No. 9; and d) prepare areas to receive the proposed new soil cover

system, perimeter drainage channels, access roads within the limits of disturbance, as indicated in the Contract Documents.

2. Off-site disposal of the existing geomembrane materials shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the lump sum price bid for this Bid Item shall include all necessary testing and characterization costs for the existing geomembrane and its underlying cushioning materials, as required by the designated disposal facility.
3. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.09 BID ITEM NO. 9: PLACE GRADING FILL (CUBIC YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, compacted Cubic Yards at actual locations of placement.
2. Measurement will be made by comparing before (i.e., prior to placement of grading fill, but following completion of subgrade preparation Work) and after (i.e., following placement of grading fill and surface re-grading Work) field record surveys of proposed new soil cover system subgrade elevations, as defined by the Contract Drawings and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to excavate, load, haul (from anywhere on-Site), unload, sort, prepare (crushing, shredding, mixing with soil), place, grade, and compact existing fill materials, which underlie the existing geomembrane, in accordance with the Contract Documents. Should additional grading fill be required to attain the specified new cover system subgrade elevations, as defined by the Contract Drawings or as directed by the GROUP's REPRESENTATIVE, additional grading fill shall be obtained from approved off-Site borrow sources, and payment for the delivery, placement, and compaction of this additional grading fill shall be made under this Bid Item.

2. Per CONTRACTOR's October 29, 2007 correspondence to the REMEDIAL DESIGNER that provided response to Requests for Bid Clarifications, CONTRACTOR agrees to provide additional imported grading fill, in accordance with the Contract Documents, in excess of the estimated quantity presented in the Bid Forms (i.e., 2,000 Cubic Yards) at a fixed unit rate of twenty-one-dollars-per-ton (\$21 per Ton), which is all inclusive and includes all chemical and geotechnical Quality Control testing, placement, grading, handling, and compaction costs. In addition, for purposes of this Contract Agreement, the GROUP assumed the equivalent unit price for additional grading fill in excess of two-thousand (2,000) Cubic Yards shall equal twenty-nine-dollars-and-forty-cents-per-cubic-yard (\$29.40 per Cubic Yard), assuming the imported grading fill has a unit weight of one-point-four (1.4) Tons-per-Cubic Yard.
3. Regardless of the actual quantity of grading fill imported to the Site, CONTRACTOR shall not be granted any modifications to the unit price for this Bid Item, unless specifically identified and/or allowed herein.
4. Progress payments, less applicable retainage, shall be made based on estimated in-place, compacted volumes, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
5. Final payment, less applicable retainage, shall be based on the final, actual in-place, compacted volumes of grading fill, as determined by comparing before (i.e., prior to placement of grading fill, but following completion of subgrade preparation Work) and after (i.e., following placement of grading fill and surface re-grading Work) field record surveys in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments. Final payment shall only be based on actual fill quantities, and not on cut quantities, as determined from pre- and post-placement surveys, irrespective of whether these quantities balance.
6. No material payments will be granted for this Bid Item.

3.10 BID ITEM NO. 10: INSTALL GEOSYNTHETIC CLAY LINER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified geosynthetic clay liner, as required by the Contract Documents and in accordance with the manufacturer's material and installation specifications.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. This Bid Item does not include payment for any subgrade preparation and placement of grading fill Work to achieve the specified new cover system subgrade elevations, as defined by the Contract Drawings, which are covered in Bid Items No. 8 and/or 9.
5. Material payments for the geosynthetic clay liner delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
6. Progress payments, less applicable retainage, for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of geosynthetic clay liner materials.
7. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.11 BID ITEM NO. 11: INSTALL NEW GEOMEMBRANE (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified new geomembrane, as required by the Contract Documents and in accordance with the manufacturer's material and installation specifications.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. Material payments for the new geomembrane delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
5. Progress payments, less applicable retainage, for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of new geomembrane materials.
6. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.12 BID ITEM NO. 12: INSTALL GEOCOMPOSITE DRAINAGE LAYER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified geocomposite drainage layer, as required by the Contract Documents and in accordance with the manufacturer's material and installation specifications.
2. Actual planimetric areas will be measured for payment with no allowances for overlaps, slopes, defective, or repaired/replaced materials.
3. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
4. Material payments for the geocomposite drainage layer delivered to the Site, stored, and adequately protected will be paid for at direct cost plus shipping charges, upon presentation of valid receipts, bills, or invoices that clearly indicating payment and receipt of said materials with CONTRACTOR's payment request, in accordance with Sub-Section 1.06 of this Section.
5. Progress payments, less applicable retainage, for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of geocomposite drainage layer materials.
6. Final payment, less applicable retainage, shall be made following Satisfactory Completion of the Work, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on

actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.

3.13 BID ITEM NO. 13: PLACE COVER SOIL (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, grade, and compact the required 18-inch-thick (minimum) cover soil layer, as specified by the Contract Documents.
2. Actual planimetric areas will be measured for payment.
3. Progress payments, less applicable retainage, shall be made based on estimated in-place, compacted planimetric areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment, less applicable retainage, shall be based on the final in-place, compacted planimetric areas of the cover soil layer, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.
5. No material payments will be granted for this Bid Item.

3.14 BID ITEM NO. 14: PLACE VEGETATIVE SUPPORT LAYER (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement.
2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, and grade the required 6-inch-thick (minimum) vegetative support layer, as specified by the Contract Documents.
2. Actual planimetric areas will be measured for payment.
3. Progress payments, less applicable retainage, shall be made based on estimated in-place, compacted planimetric areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
4. Final payment, less applicable retainage, shall be based on the final in-place, compacted planimetric areas of the cover soil layer, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.
5. No material payments will be granted for this Bid Item.

3.15 BID ITEM NO. 15: IN-SITU "HOT SPOT" TREATMENT FIELD VERIFICATION PROGRAM (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-situ "Hot Spot" Treatment Field Verification Program.
2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment Field Verification Program production activities.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all labor, equipment, and materials, excluding all labor, materials, and equipment costs in connection with the required volatile organic chemical (VOC) off-gas collection, treatment, and discharge system that will be compensated under Bid Items No. 29 and 29-A, to undertake and complete the required In-Situ "Hot Spot" Treatment Field Verification Program, as specified in Section 02450 of the Technical Specifications. Furthermore, all labor, equipment, and materials used in this field verification program shall be identical to CONTRACTOR's anticipated, planned In-Situ "Hot Spot" Treatment Production Operation methods, which will be employed and compensated under Bid Item No. 16.

2. CONTRACTOR shall undertake and complete the specified In-Situ “Hot Spot” Treatment Field Verification Program to the satisfaction of the GROUP, the GROUP’s REPRESENTATIVE, and the REMEDIAL DESIGNER. In addition, CONTRACTOR shall use all of its best efforts and exhaust all reasonable options/alternatives to achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications. At a minimum, this Field Verification Program shall consider and establish, but not be limited to, the following: a) ISAS mixing procedures, rate, and durations; b) ISS design mix requirements (i.e., reagent proportions); and c) relative benefits of various ISAS mixing mediums (i.e., ambient air, steam, and oxidizing agents), as necessary.
3. This Bid Item shall include all costs associated with the preparation and submission of all required local, state, and federal permits in connection with this Work, excluding all costs associated with obtaining the requisite air quality discharge permit, which will be compensated under Bid Item 29-A. In addition, this Bid Item shall include all costs associated with the required In-Situ “Hot Spot” Treatment Work Plan and other required submittals, and this work plan shall include allowances for variations in mixing procedures, rates, and hold times. In addition, this plan shall include provisions for evaluating different mixing/reagent materials, as CONTRACTOR deems necessary and appropriate.
4. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project’s designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
5. Payment of this Bid Item shall be in full, less applicable retainage, upon completion of the specified In-situ “Hot Spot” Treatment Field Verification Program, as determined and established by the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER.

3.16 BID ITEM NO. 15-A: IN-SITU “HOT SPOT” TREATMENT POST-FIELD VERIFICATION PROGRAM STAND-BY TIME (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-situ “Hot Spot” Treatment Field Verification Program.

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2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment Field Verification Program stand-by period.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all in-situ treatment equipment (i.e., no labor and material costs shall be included under this Bid Item) stand-by costs associated with the required In-Situ "Hot Spot" Treatment Field Verification Program, as specified in Section 02450 of the Technical Specifications.
2. Payment of this Bid Item shall be in full, less applicable retainage, upon completion of the specified In-situ "Hot Spot" Treatment Field Verification Program, as determined and established by the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER.

3.17 BID ITEM NO. 16: IN-SITU "HOT SPOT" TREATMENT ISAS/ISS PRODUCTION OPERATIONS (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations.
2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment ISAS/ISS Production Operations.

B. Payment:

1. CONTRACTOR shall not undertake or perform any Work under this Bid Item until after the successful and satisfactory completion of Bid Item No. 15, and only upon direction of the GROUP's REPRESENTATIVE.
2. The unit price for this Bid Item shall be full compensation for all labor, equipment, and materials, excluding all labor, materials, and equipment costs in connection with the required volatile organic chemical (VOC) off-gas collection, treatment, and discharge system that will be compensated under Bid Items No. 29 and 29-A, to undertake and complete the specified In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations. Furthermore, all labor, equipment, and materials used during these production operations shall be identical to those incorporated, performance tested, and verified under Bid Item No. 15.

3. CONTRACTOR shall undertake and complete all In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations to the spatial and vertical limits specified in the Contract Drawings and in accordance with Section 02450 of the Technical Specifications. CONTRACTOR’s unwillingness or failure to complete the specified In-Situ “Hot Spot” Treatment work in accordance with the Contract Documents will be grounds for termination, subject to the provision within the Contract Agreement.
4. The Work under this Bid Item shall be completed within a maximum duration of thirty-seven (37) Workdays, with no additional compensation for any duration of Work in excess of thirty-seven (37) Workdays. However, if CONTRACTOR completes the Work under this Bid Item within a period less than thirty-seven (37) Workdays, CONTRACTOR shall receive a fifty-percent (50%) cost sharing incentive for any approved, unused surplus quantities of this Bid Item, provided CONTRACTOR’s In-Situ “Hot Spot” Treatment activities successfully achieve the specified performance criteria.
5. This Bid Item assumes the designated “Hot Spot” will be treated in-situ, and the entire treated mass will achieve the specified performance criteria, as defined in Section of 02450 of the Technical Specifications. Therefore, this Bid Item excludes all post-treatment excavation, handling, hauling, and disposal costs of any treated materials that do not achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
6. This Bid Item shall include all Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents, as specified in Section 02450 of the Technical Specifications and the project’s designated Construction Quality Assurance Plan (CQAP). This price also includes efforts, by CONTRACTOR, to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
7. Progress payments, less applicable retainage, shall be made based on CONTRACTOR’s records of actual durations of Work performed under this Bid Item, which shall be submitted to the GROUP’s REPRESENTATIVE and the REMEDIAL DESIGNER for favorable review and verification.
8. Final payment, less applicable retainage, of this Bid Item shall be based on the actual duration, subject to verification by the GROUP’s REPRESENTATIVE and/or the REMEDIAL DESIGNER, of the In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations plus any applicable cost sharing incentives and minus any and all previous progress payments. Furthermore, if the actual duration of In-Situ “Hot Spot” Treatment ISAS/ISS Production Operations exceeds thirty-seven

(37) Workdays, the GROUP shall not provide any addition compensation in excess of thirty-seven (37) Workdays.

3.18 BID ITEM NO. 17: INSTALL NEW SHEET PILE WALL (SQUARE FEET)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of installed Square Feet of new steel sheet piling surface area, projected against the walls vertical axis.
2. Measurement will be made by multiplying actual linear feet of installed new steel sheet piling, along the centerline of the sheet pile wall section, by documented installed sheet pile lengths/depths, as presented on the field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER for review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the specified new steel sheet piling at the prescribed locations and minimum depths of embedment, as specified by the Contract Documents, and subsequently demolish, remove, and dispose of the uppermost portion of the existing steel sheet pile wall, as specified in the Contract Documents. CONTRACTOR shall not be compensated for any portions of new steel sheet piling that extend below the prescribed minimum embedment depths, as shown on the Contract Drawings.
2. Progress payments, less applicable retainage, shall be made based on estimated installed surface areas of new steel sheet piling, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment, less applicable retainage, shall be based on final installed surface areas of new steel sheet piling, as determined by multiplying actual linear feet of installed new steel sheet piling by documented installed sheet pile lengths/depths, as presented on the field record drawings prepared and submitted by CONTRACTOR to the GROUP's REPRESENTATIVE in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.19 **BID ITEM NO. 18: CONSTRUCT PERIMETER ACCESS ROAD (LUMP SUM)**

A. **Measurement:**

1. The Work required for this Bid Item will not be measured for payment.

B. **Payment:**

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to complete the installation of the specified perimeter access roads, as shown on the Contract Drawings. Construction activities associated with this Work will involve, but may not be limited to, the following: subgrade preparation; installation of base geotextiles; placement of dense graded aggregates; and fine grading.
2. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
4. No material Payment will be granted for this Bid Item.

3.20 **BID ITEM NO. 19: PLACE STONE AGGREGATE AND RIP-RAP (CUBIC YARD)**

A. **Measurement:**

1. The Work required for this Bid Item will be measured for payment in the units of in-place Cubic Yards at actual locations of placement.
2. Measurement will be made by comparing before (i.e., prior to placement of stone aggregate and/or rip-rap materials) and after (i.e., following placement of stone aggregate and/or rip-rap materials) field record surveys, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. **Payment:**

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, place, and grade the required stone aggregate and rip-rap materials within the perimeter drainage channels, as specified in the Contract Documents and as directed by the REMEDIAL DESIGNER.
2. Progress payments, less applicable retainage, shall be made based on estimated in-place volumes, as prepared by CONTRACTOR and

submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

3. Final payment, less applicable retainage, shall be based on the final in-place volume of stone aggregate and rip-rap material, as determined by comparing before (i.e., prior to placement of stone aggregate and rip-rap materials) and after (i.e., following placement of stone aggregate and rip-rap materials) field record surveys in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.21 BID ITEM NO. 20: INSTALL 12-IN-DIA ROAD CULVERT (LINEAR FEET)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place Linear Feet of actually installed piping.
2. Measurement will be based on actual measure lengths of installed piping, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, install, and backfill around the specified 12-in-dia. roadway culvert within the perimeter drainage channels to achieve the proposed finished ground surface elevations, as specified by the Contract Documents.
2. Progress payments, less applicable retainage, shall be made based on estimated lengths of installed piping, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
3. Final payment, less applicable retainage, shall be based on the final installed lengths of piping, as presented on the field record drawings prepared by CONTRACTOR and in accordance with Sub-Section 1.05 of this Section, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

3.22 BID ITEM NO. 21: DEMOLITION (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall include full compensation for all labor and equipment to demolish the existing single-story building structure, excluding the existing floor slab and foundations, located on-Site, as identified in the Contract Drawings, and its appurtenances, and for proper characterization and disposal of all demolition materials and debris off-Site. This Bid Item shall include all identification, location, disconnecting, and decommissioning of utility services to this existing building. In addition, this Bid Item includes all necessary hazardous material surveys, abatement, and proper disposal of all non-hazardous materials off-Site.
2. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove the existing mobile trailer, as identified in the Contract Drawings, and for return of said mobile trailer to its leasing company. This Bid Item shall include all identification, location, disconnecting, and decommissioning of utility services to this existing mobile trailer.
3. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to demolish the identified existing groundwater extraction system header/piping, Above-ground Storage Tank, and associate appurtenances, as identified in the Contract Drawings, and for proper disposal of all demolition materials and debris off-Site. In addition, this Bid Item shall include the off-Site disposal of stockpiled pre-existing groundwater extraction system headers/piping, which is located south of the existing building structure to be demolished.
4. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove portions of the existing chain link fence and gates at the locations indicated on the Contract Drawings and as directed by the GROUP's REPRESENTATIVE, including off-Site disposal of the posts, fabric, and concrete, filling the remaining post holes with cover soil, and/or hydrated bentonite chips, and seeding.
5. The lump sum price bid for this Bid Item shall also include full compensation for all labor and equipment to remove the identified Investigation Derived Waste (IDW) materials that currently resides on-Site inside and around the existing building structure to be demolished. If these IDW materials satisfy the requirements of grading fill, they may

be reused on-Site, and if not reused on-Site, CONTRACTOR shall dispose of said IDW materials off-Site, and all costs associated with the characterization and off-Site disposal of any identified IDW materials shall be included under this Bid Item.

6. This lump sum price bid for this Bid Item shall include all Work identified on the Contract Drawings and in Section 02060 of the Technical Specifications. In addition, this Bid Item shall include all costs associated with the preparation and filing of any local, state, and/or federal permits required for this Work, as necessary.
7. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
8. Final payment, less applicable retainage, shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.23 BID ITEM NO. 22: WELL DECOMMISSIONING (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit actually removed.
2. Measurement will be based on actual numbers of removed wells and/or piezometers, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor and equipment to drill and backfill (i.e., with grout) all identified wells and/or piezometers requiring decommissioning, as indicated in the Contract Drawings. This Bid Item shall include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare and submit all require well decommission reports with the New Jersey Department of Environmental Protection (NJDEP).
2. Progress payments, less applicable retainage, shall be made based on actual numbers of decommissioned wells and/or piezometers, as reviewed and verified by the GROUP's REPRESENTATIVE.

3. Final payment, less applicable retainage, shall be based on the final number of decommissioned wells and/or piezometers, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

3.24 BID ITEM NO. 23: INSTALL NEW PERIMETER CHAIN LINK FENCE (LINEAR FOOT)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to in the units of Linear Feet of actual installed chain link fence.
2. Measurement will be based on actual lengths of installed chain link fence, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to install new chain link fencing and gates at locations indicated on the Contract Drawings, including procurement, delivery, and installation of posts, fabric, supports, gates, and barbed wire, as well as physical connections to the proposed new steel sheet pile wall, grading around the base of the post holes to promote positive drainage, and the procurement and installation of warning signs, in accordance with the requirements of the Contract Documents, and as directed by the GROUP's REPRESENTATIVE.
2. This Bid Item excludes all costs associated with the removal and disposal of any portions of the existing chain link fence and gates at the locations indicated on the Contract Drawings and as directed by the GROUP's REPRESENTATIVE, including off-Site disposal of the posts, fabric, and concrete, filling the remaining post holes with cover soil, and/or hydrated bentonite chips, and seeding. All costs associated with the removal of any portions of the existing chain link fence shall be compensated under Bid Item No. 21.
3. Except for tie wires, fabric bands, lock wires, and concrete foundations, fence materials removed may be salvaged to the extent possible for reinstallation in accordance with the Contract Documents. Fabric proposed for reuse shall be subject to favorable review by the GROUP's REPRESENTATIVE prior to reuse. CONTRACTOR shall indicate to the GROUP's REPRESENTATIVE the cost savings that can be realized by re-using the previously removed fence fabric, and this amount will be deducted from the payment application submitted following the completion of the fence installation.

4. Progress payments, less applicable retainage, shall be made based on actual lengths of installed new chain link fence, as reviewed and verified by the GROUP's REPRESENTATIVE.
5. Final payment, less applicable retainage, shall be based on the final lengths of installed new chain link fence, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
6. No material payments will be granted with this Bid Item.

3.25 BID ITEM NO. 24: INSTALL PRE-ENGINEERED METAL BUILDING (LUMP SUM)

A. Measurement:

1. The Work required for this Bid Item will not be measured for payment.

B. Payment:

1. The lump sum price bid for this Bid Item shall be full compensation for all labor, equipment, and material necessary to provide "design-build" services for the design and construction of a pre-fabricated, pre-engineered metal building with all identified appurtenances (i.e., Above-ground Storage tank, compressor, controls, etc.), as specified in the Contract documents. This Bid Item includes all interior finishes, utility services (water, gas, sanitary sewer, electric, and telephone), interior mechanical, electrical, and plumbing systems, so that the building is completely operational, as intended by the GROUP. This Bid Item also includes the development of construction-level drawings for the GROUP's approval, and for obtaining all necessary local, state, and federal approvals and permits. CONTRACTOR shall identify and furnish all miscellaneous interior finish items not specified, and show proposed foundation modifications, as necessary, to suit the pre-engineered metal building structure.
2. The Bid Item assumes the existing floor slabs and foundation may be re-used and are adequate to support the specified Pre-Engineered Metal Building
3. Progress payments, less applicable retainage, shall be made based on the percent complete of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.

5. No material payments will be granted with this Bid Item.

3.26 BID ITEM NO. 25: INSTALL GROUNDWATER RECOVERY WELLS (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit actually installed.
2. Measurement will be based on actual numbers of new groundwater recovery wells installed, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP'S REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor, equipment, and materials to drill and install the identified new groundwater recovery wells, as specified in the Contract Drawings (see Contract Drawings No. SCP-7 and SCP-8) and as directed by the Remedial Designer. This Bid Item shall include all excavation, dewatering, handling of materials, installation of vaults, access hatches, pumps, and well casings, placement of the specified filter stone around said well casings, and providing all system controls and connections to carrier pipes and pneumatic/discharge lines/headers. This Bid Item shall also include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP'S REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare, submit, and obtain all necessary well drilling permits from NJDEP.
2. For purposes of bidding and payment, CONTRACTOR shall assume each new groundwater recover well will be installed fifteen (15) feet beneath the proposed final grades of the new cover system, and this Bid Item includes all appropriate provisions and materials to achieve these installed depths.
3. Progress payments, less applicable retainage, shall be made based on actual numbers of new groundwater recovery wells installed, as reviewed and verified by the GROUP'S REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be based on the final number of new groundwater recovery wells installed, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP'S REPRESENTATIVE, minus any and all previous progress payments.
5. No material payments will be granted with this Bid Item.

3.27 BID ITEM NO. 26: INSTALL GROUNDWATER RECOVERY SYSTEM CARRIER PIPES (LINEAR FOOT)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to in the units of Linear Feet of actual installed groundwater recovery system carrier pipes.
2. Measurement will be based on actual lengths of installed groundwater recovery system carrier pipes, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to procure, deliver, stockpile, and install the required new groundwater recovery system carrier pipes, as specified by the Contract Documents and as directed by the REMEDIAL DESIGNER. This Bid Item shall include, but may not be limited to, all excavation, temporary stockpiling of excavated materials, regrading of excess materials beneath the new soil cover system, dewatering, backfill, and compaction Work. In addition, this Bid Item shall include the installation of all pneumatic compressed air supply lines/tubing and liquid discharge lines, which reside within the "Primary" carrier pipes, as indicated on the Contract Drawings.
2. Progress payments, less applicable retainage, shall be made based on actual lengths of installed new groundwater recovery system carrier pipes, as reviewed and verified by the GROUP's REPRESENTATIVE.
3. Final payment, less applicable retainage, shall be based on the final lengths of installed new groundwater recovery system carrier pipes, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
4. No material payments will be granted for this Bid Item.

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3.28 BID ITEM NO. 27: INSTALL NEW PIEZOMETERS (EACH)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment according to Each unit actually installed.
2. Measurement will be based on actual numbers of new piezometers installed, as presented on the field record drawings prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.

B. Payment:

1. The unit price bid for this Bid Item shall be for full compensation for all labor, equipment, and materials to drill and install the identified new piezometers, as specified in the Contract Drawings (see Contract Drawings No. SCP-7 and No. SCP-8) and as directed by the Remedial Designer. This Bid Item shall include on-Site disposal of all spoil materials generated, beneath the new cover system and at locations acceptable to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER. In addition, this Bid Item includes all costs for CONTRACTOR to prepare, submit, and obtain all necessary well drilling permits from NJDEP.
2. For purposes of bidding and payment, CONTRACTOR shall assume each new piezometer will be installed fifteen (15) feet beneath the proposed final grades of the new cover system, and this Bid Item includes all appropriate provisions and materials to achieve these installed depths.
3. Progress payments, less applicable retainage, shall be made based on actual numbers of new piezometers installed, as reviewed and verified by the GROUP's REPRESENTATIVE.
4. Final payment, less applicable retainage, shall be based on the final number of new piezometers installed, as indicated on the field record drawings prepared by CONTRACTOR and verified by the GROUP's REPRESENTATIVE, minus any and all previous progress payments.
5. No material payments will be granted with this Bid Item.

3.29 BID ITEM NO. 28: INSTALL NON-WOVEN GEOTEXTILES (SQUARE YARD)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of in-place, installed Square Yards at actual locations of placement, which are not included under other Bid Items.

2. Measurement will be made based on CONTRACTOR's field record survey drawings, as required by the Contract Documents and in accordance with Sub-Section 1.05 of this Section.

B. Payment:

1. The unit price bid for this Bid Item shall be compensation for all labor, equipment, and materials to procure, deliver, and install the specified non-woven geotextile materials, as specified in the Contract Documents.
2. This Bid Item includes all manufacturer and installer Quality Control procedures and testing to demonstrate compliance with the requirements of the Contract Documents and the project's designated Construction Quality Assurance Plan (CQAP). This price also includes the Installer's effort to assist the REMEDIAL DESIGNER and the QAO to obtain representative material samples for independent laboratory testing, in accordance with the CQAP.
3. Progress payments for this Bid Item will be based on estimated in-place, tested, and approved areas, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, with deductions made for amounts(s) previously paid for delivery and installation of non-woven geotextile materials.
4. Final payment shall be made following satisfactory completion of this Bid Item, as determined and established by the GROUP's REPRESENTATIVE, and final payment will be based on actual installed quantities, as shown of CONTRACTOR's field record drawings, minus any and all previous progress and material payments.
5. No material payments will be granted with this Bid Item.

3.30 BID ITEM NO. 29: IN-SITU "HOT SPOT" TREATMENT VOC OFF-GAS ACTIVATED CARBON USAGE (POUNDS)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of Pounds of activated carbon actually delivered to the Site and consumed/used over the entire duration of the specified In-situ "Hot Spot" Treatment Field Verification Program (i.e., Bid Item No. 15) and Production Operations (i.e., Bid Item No. 16).
2. Measurement will be based on actual physical weight measurements, utilizing methods established by CONTRACTOR and deemed acceptable to the REMEDIAL DESIGNER, of activated carbon delivered to the Site over the entire duration of the In-Situ "Hot Spot" Treatment Field Verification Program and Production Operations.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all labor, material, equipment, delivery, transportation, and management costs in connection with providing, changing out, and supplying all required activated carbon required by the In-Situ “Hot Spot” Treatment VOC Collection, Treatment, and Discharge System, over the entire duration of the Field Verification Program and ISAS/ISS Production Operations, which are include under Bid Items No. 15 and 16.
2. Retainage shall not be withheld for this Bid Item.
3. Regardless of the actual quantity of activated carbon delivered to the Site, CONTRACTOR shall not be granted any modifications to the unit price for this Bid Item, as stipulated in the Bid Forms, and CONTACTOR shall not be allowed to use any variations, upwards or downward from the estimated values presented in the Bid Forms, in the actual quantities for this Bid Item as cause for
4. This Bid Item shall exclude all labor, materials, and equipment costs in connection with the required In-Situ “Hot Spot” Treatment VOC Off-Gas Collection, Treatment, and Discharge System, which will be compensated under Bid Items No. 29-A.
5. This Bid Item will be for actual quantities of activated carbon used on-Site, and modifications to the unit price for this Bid Item will not be granted by the GROUP, regardless of the actual quantity of activated carbon delivered and used over the entire duration of the project.
6. Progress payments shall be made based on estimated quantities, as prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification.
7. Final payment shall be based on the final, actual quantities, as prepared by CONTRACTOR and submitted to the GROUP’s REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

3.31 BID ITEM NO. 29-A: IN-SITU “HOT SPOT” TREATMENT VOC OFF-GAS COLLECTION, TREATMENT, AND DISCHARGE SYSTEM (DAY)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of each Workday during the specified In-Situ “Hot Spot” Treatment Field Verification Program (Bid Item No. 15) and ISAS/ISS Production Operations (Bid Item No. 16).

2. Measurement will be based on the GROUP's REPRESENTATIVE's and/or the REMEDIAL DESIGNER's field records, based on the actual duration of the In-situ "Hot Spot" Treatment Field Verification Program and ISAS/ISS Production Operations.

B. Payment:

1. The unit price for this Bid Item shall be full compensation for all labor, materials, and equipment costs in connection with the required In-Situ "Hot Spot" Treatment VOC Collection, Treatment, and Discharge System, over the entire duration of the Field Verification Program and ISAS/ISS Production Operations, which are include under Bid Items No. 15 and 16, respectively.
2. The Work under this Bid Item shall be completed within a maximum of forty-seven (47) Workdays, with no additional compensation for any Work in excess of a total of forty-seven (47) Workdays.
3. This Bid Item shall include all costs associated with preparing, submitting, and obtaining the required air quality discharge permit from the New Jersey Department of Environmental Protection (NJDEP). In addition, this Bid Item shall include all field and laboratory-testing costs in connection with the VOC Collection, Treatment, and Discharge System, as required by the Contract Documents and/or NJDEP.
4. This Bid Item shall exclude all labor, material, equipment, delivery, transportation, and management costs in connection with providing, changing out, and supplying all required activated carbon required by the In-Situ "Hot Spot" Treatment VOC Off-Gas Collection, Treatment, and Discharge System, which will be compensated under Bid Items No. 29.
5. Progress payments, less applicable retainage, shall be made based on CONTRACTOR's records of actual durations of Work performed under this Bid Item, which shall be submitted to the GROUP's REPRESENTATIVE and the REMEDIAL DESIGNER for favorable review and verification.
6. Final payment, less applicable retainage, of this Bid Item shall be based on the actual duration, subject to verification by the GROUP's REPRESENTATIVE and/or the REMEDIAL DESIGNER, of the In-Situ "Hot Spot" Treatment ISAS/ISS Production Operations minus any and all previous progress payments. Furthermore, if the actual combined total duration of In-Situ "Hot Spot" Treatment Field Verification Program and ISAS/ISS Production Operations exceeds forty-seven (47) Workdays, the GROUP shall not provide any addition compensation in excess of forty-seven (47) Workdays.

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3.32 BID ITEM NO. 30: MANAGEMENT AND DISPOSAL OF SURFACE AND DECONTAMINATION FLUIDS (GALLON)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of actual Gallons of surface and/or decontamination fluids disposed off-Site.
2. Measurement will be made based on actual volumetric measurements, utilizing flow meters, depth gauges with storage tanks, or other means deemed acceptable to the REMEDIAL DESIGNER, of surface and decontamination fluids disposed of off-Site.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to collect, manage, handle, transfer to on-Site storage tanks, and dispose off-Site all surface water that came in contact with existing on-Site waste materials and all decontamination fluids generated over the course of the CONTRACTOR's construction activities, as specified by the Contract Documents.
2. Retainage shall not be withheld for this Bid Item.
3. Off-site disposal of all surface water and decontamination fluids shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the unit price bid for this Bid Item shall include all necessary testing and characterization costs, as required by the designated disposal facility.
4. Progress payments, less applicable retainage, shall be made based on estimated volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
5. Final payment, less applicable retainage, shall be based on the final, actual volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

3.33 BID ITEM NO. 31: MANAGEMENT AND DISPOSAL OF GROUNDWATER (GALLON)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of actual Gallons of groundwater disposed off-Site.

2. Measurement will be made based on actual volumetric measurements, utilizing flow meters, depth gauges with storage tanks, or other means deemed acceptable to the REMEDIAL DESIGNER, of groundwater disposed of off-Site.

B. Payment:

1. The unit price bid for this Bid Item shall be full compensation for all labor, equipment, and materials to collect, manage, handle, transfer to on-Site storage tanks, and dispose off-Site all groundwater generated over the course of the CONTRACTOR's construction activities, as specified by the Contract Documents.
2. Retainage shall not be withheld for this Bid Item.
3. Off-site disposal of all surface water and decontamination fluids shall be at a facility approved by the GROUP's REPRESENTATIVE. In addition, the unit price bid for this Bid Item shall include all necessary testing and characterization costs, as required by the designated disposal facility.
4. Progress payments, less applicable retainage, shall be made based on estimated volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
5. Final payment, less applicable retainage, shall be based on the final, actual volumetric quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

PART 4 – ALTERNATE CONTRACT PAYMENT ITEMS

4.01 ALTERNATE BID ITEM NO. 16-A: IN-SITU "HOT SPOT" TREATMENT EXCAVATION, OFF-SITE DISPOSAL, AND BACKFILL OF TREATED MASS (TON)

A. Measurement:

1. The Work required for this Bid Item will be measured for payment in the units of actual measured Tons of ISAS/ISS treated materials from the designated In-Situ "Hot Spot" Treatment area.
2. Measurement will be based on actual measurements, utilizing methods established by CONTRACTOR and deemed acceptable to the

REMEDIAL DESIGNER, of actual treated materials excavated and disposed off-Site.

B. Payment:

1. CONTRACTOR shall not undertake or perform any Work under this Bid Item until after completion of Bid Item No. 15, and only upon direction of the GROUP's REPRESENTATIVE.
2. This Bid Item assumes the designated "Hot Spot" will be treated in-situ, but the specified In-Situ "Hot Spot" Treatment performance criteria, as defined in Section of 02450 of the Technical Specifications, cannot be reasonably achieved to the satisfaction of the USEPA and NJDEP. Therefore, this Bid Item includes all post-treatment excavation, handling, hauling, characterization, disposal, backfill, and compaction costs for those portions of the treated mass that do not achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications.
3. This Bid Item shall also include all additional health and safety measure, air emission control, and quality control costs required during the post-treatment excavation and off-Site disposal operations. In addition, this Bid Item shall include all costs associated with the infilling of these post-treatment excavations, including the import of additional grading fill, as necessary, and all backfilling and compaction costs, as required.
4. Those portions of the treated mass that do achieve the specified performance criteria, as defined in Section 02450 of the Technical Specifications shall remain on-Site, and payment for these portions of the Work will be compensated under Bid Item No. 16.
5. Progress payments, less applicable retainage, shall be made based on estimated quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification.
6. Final payment, less applicable retainage, shall be based on the final, actual quantities, as prepared by CONTRACTOR and submitted to the GROUP's REPRESENTATIVE for favorable review and verification, minus any and all previous progress payments.

***** END OF SECTION *****

SECTION 02460

STEEL SHEET PILING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. CONTRACTOR shall furnish all labor, equipment, materials, tools, and appurtenances, and perform all operations necessary for installing steel sheet piles, as indicated on the Contract Drawings and as specified herein.
- B. CONTRACTOR shall comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, State, or Federal authorities having jurisdiction. CONTRACTOR is responsible for identifying and obtaining all appropriate licenses, approvals, and permits to complete the work of this Section. CONTRACTOR shall provide a “Competent Person” to implement, supervise, and inspect the Work.
- C. CONTRACTOR shall locate all existing active and abandoned utilities and structures in designated Work areas prior to commencing any steel sheet pile installations. CONTRACTOR shall also protect from damage those utilities and structures which are to remain in place.
- D. Given the critical nature and general instability of the existing steel sheet pile wall system along Peach Island Creek, CONTRACTOR shall take all appropriate precautions, as it deems necessary, to protect the existing steel sheet pile wall system and prevent any induced lateral and/or rotational movements of this wall, under any applied construction material and equipment loads.
- E. CONTRACTOR shall be responsible for maintaining the integrity of the existing perimeter slurry wall system, and shall take all appropriate precautions, it deems necessary, to protect said slurry wall system. If the integrity of the existing perimeter slurry wall system is compromised, due to CONTRACTOR’s actions or any Work performed under this Contract Agreement, CONTRACTOR shall repair and/or replace, at its own cost, said impacted slurry wall sections in kind and to acceptance of the REMEDIAL DESIGNER.

1.02 RELATED SECTIONS

- A. 01050 – Field Engineering/Surveying
- B. 01564 – Health and Safety
- C. 02100 – Site Preparation
- D. 02220 – Excavation
- E. 02223 – Backfill and Fill
- F. 02831 – Chain Link Fence and Gates

1.03 REFERENCES

The latest editions of the publications listed below form part of these Technical Specifications:

A. American Welding Society (AWS):

1. AWS D1.1/D1.1M – Structural Welding Code (Steel).

B. ASTM International (ASTM):

1. ASTM A328/A328M – Steel Sheet Piling.
2. ASTM A572/A572M – High-Strength, Low-Alloy Columbium-Vanadium Structural Steel.
3. ASTM A6/A6M – General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
4. ASTM A690/A690M – High-Strength, Low-Alloy Steel H-Piles and Sheet Piling for Use in Marine Environments.
5. ASTM A857/A857M – Steel Sheet Piling, Cold-Formed, Light Gage
6. ASTM A36/A36M – Carbon Structural Steel.

1.04 SUBMITTALS

A. Sheet Pile Wall Installation Work Plan: Prior to commencement of steel sheet piling installation activities on-Site, CONTRACTOR shall prepare and submit, to the GROUP's REPRESENTATIVE, a detailed, comprehensive steel sheet pile installation work plan, which includes, but not limited to, the following:

1. CONTRACTOR and/or SUBCONTRACTOR Qualifications;
2. Methods and sequences of construction;
3. Material storage and lay-down areas;
4. Complete descriptions of sheet piling driving equipment, including hammers, extractors, protection caps, and other installation appurtenances;
5. Proposed methods of extracting, pulling and/or re-driving of installed steel sheet piling;
6. Manufacturer and/or supplier product data sheets; and
7. Material certificates.

B. Shop Drawings: Prior to commencement of steel sheet piling installation activities on-Site, CONTRACTOR shall prepare and submit, to the GROUP's REPRESENTATIVE, detailed drawings for the specified steel sheet piling, including fabricating sections. These drawings shall show complete piling dimensions and details, driving sequences, and locations of installed piling. These drawings shall include details of top protection, special reinforcing tips, tip protection, lagging, splices, fabricated additions to plain piles, cut-off methods, and dimensions of templates and other temporary guide structures for installing

piling. Drawings shall provide details of the methods of handling piling to prevent permanent deflection, distortion, or damage to piling interlocks.

- C. Records: CONTRACTOR shall prepare, maintain, and submit, to the GROUP's REPRESENTATIVE, complete records of the completed sheet piling driving operations. These records shall provide a system of identification that shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions, and top and bottom elevations of installed piling.
- D. Manufacturer's Mill Certificates: For each shipment of material, CONTRACTOR shall submit, to the GROUP's REPRESENTATIVE, copies of all Manufacturer certified material test reports, showing that the sheet piling and appurtenant metal materials meet the specified requirements. These mill certificates shall be submitted for each shipment of material, and corresponding lot numbers for each shipment shall be clearly noted on said certificates. Material test reports shall meet the requirements of ASTM A6/A6M. Identification data shall include, but not be limited to, piling types, dimensions, chemical compositions, mechanical properties, section properties, heat numbers, and mill identification marks.
- E. Submit in accordance with Section 01300 of these Technical Specifications.

1.05 DELIVERY, HANDLING AND STORAGE

- A. Materials delivered to the Site shall be new and undamaged, and shall be accompanied by the Manufacturer's mill certification reports.
- B. Sheet piling shall be stored and handled in the manner recommended by the Manufacturer to prevent permanent deflection, distortion, or damage to the interlocks. At a minimum, CONTRACTOR shall support all sheet piling on level blocks or racks spaced not more than ten (10) feet apart, and not more than two (2) feet from the ends.
- C. Concentrated loads that occur during stacking or lifting shall be limited to less than those that could produce permanent deformation of the material.
- D. Sheet pile handling devices shall be designed such that damage to protective coatings applied to the steel sheets is prevented.
- E. Storage of steel sheet piling shall be in such a manner to facilitate required inspection activities.

1.06 EQUIPMENT

- A. CONTRACTOR shall submit complete descriptions of the driving equipment, including caps, leads, and guides where required. The description of the hammer proposed for driving piles shall include make and model number.
- B. CONTRACTOR shall not be allowed to position any construction material or equipment loads within a forty (40) feet horizontal offset area behind the existing steel sheet pile wall, as measured from the top of the wall, unless specifically directed or approved otherwise by the REMEDIAL DESIGNER.
- C. CONTRACTOR shall select the pile driving method and equipment such that existing buildings and structures, as specified in Sub-Section 1.08 herein, are protected against damage due to vibration and settlement that may be caused by the pile driving operation.
- D. CONTRACTOR shall make such substitutions and modifications, found to be necessary during the progress of the work, as approved by the REMEDIAL DESIGNER.

1.07 DESIGNING AND DETAILING

- A. The locations, arrangements, lengths, and cross sections of steel sheets shall be as shown/indicated on the Contract Drawings.
- B. CONTRACTOR shall design and detail all corners, wyes, and other special shapes, connections, and appurtenant items necessary to make the sheet pile retaining wall complete.
- C. CONTRACTOR shall submit detail drawings, including design computations, to the GROUP's REPRESENTATIVE and REMEDIAL DESIGNER for approval.

1.08 PROTECTION OF PEOPLE AND PROPERTY

- A. CONTRACTOR shall plan and conduct its operations and take all necessary precautions to prevent damage to existing utilities, structures, roads, grades, slopes, surface water drainage features, underground piping, manholes, monitoring wells, piezometers, and other site features; to safeguard people and property; to minimize traffic inconvenience; to minimize dust and odors; and to provide safe working conditions. CONTRACTOR shall repair, to the GROUP's REPRESENTATIVE's satisfaction, and at no additional expense or delay to the GROUP, any and all damage which occurs as a result of the excavation work.

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PART 2 – PRODUCTS

2.01 STEEL SHEET PILING

- A. Steel sheet piles shall be hot-rolled, and conform to ASTM A572/A572M, Grade 50. Cold-rolled sections may be utilized provided said cold-rolled section and interlocks provide equivalent strength and stiffness properties.
- B. Provide and install AZ-18, or approved equivalent, steel sheet pile sections. These sheet piles shall have minimum effective Section Modulus (S_{xx}) and Moment of Inertia (I_{xx}) values of 33.5 in³/foot and 250.4 in⁴/foot, respectively.
- C. All steel sheet piling shall be installed at the locations and to the depths shown on the Contract Drawings.
- D. Sheet piling interlocks shall be free-sliding, provide swing angles suitable for the intended installation, but not less than three (3) angular degrees when interlocked, and maintain continuous interlocking when installed.

2.02 APPURTENANT MATERIALS

- A. Metal plates, shapes, bolts, nuts, rivets, and other appurtenant fabrication and installation materials shall conform to Manufacturer's standards, and to the requirements specified in the respective sheet piling standards.
- B. Structural and miscellaneous steel shall conform to ASTM A36/A36M.

PART 3 – EXECUTION

3.01 ALIGNMENT AND TOLERANCES

- A. CONTRACTOR shall furnish necessary surveying services for establishing sheet piling locations, in accordance with Section 01050 of these Technical Specifications.
- B. Any sheet piles driven/installed more than three (3) inches from the locations indicated on CONTRACTOR's approved steel sheet piling shop drawings will be rejected.
- C. Sheet piling shall be driven plumb, and shall not deviate from the vertical by more than 1/8-inch-per-foot. If at any time, the sheet piles are found to be out of plumb CONTRACTOR shall immediately take corrective measures to bring the effected sheet piles back into specified tolerances to ensure plumbness of the succeeding piles are not effected.
- D. Prior to undertaking any corrective measures, CONTRACTOR shall submit its proposed methods, to the REMEDIAL DESIGNER for approval, to correct sheet

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pile sections that are out of alignment or plumbness. All corrective measures shall not compromise the capability of the interlocks.

- E. CONTRACTOR shall provide suitable guide structures to ensure that piles and driving equipment are properly aligned during driving. Guide structures shall be equipped with suitable devices to avoid damaging protective coating of sheet piles, as necessary.
- F. Costs associated with corrective actions and/or removing/re-driving of rejected sections of steel sheet piling shall be at CONTRACTOR's own cost, and not reimbursed by the GROUP.

3.02 DRIVING

- A. Sheet piles shall be driven in sections and sequence as may be indicated on the Contract Drawings and as specified herein.
- B. Prior to driving sheet piles, existing obstructions and utilities shall be located and removed.
- C. No sheet piles shall be driven within fifty (50) feet of newly placed concrete which is less than forty-eight (48) hours old.
- D. All steel sheet piles shall be driven to or below the tip elevations (i.e., toe-of-wall) indicated on the Contract Drawings.
- E. Protective caps shall be used during driving operations, as required by the REMEDIAL DESIGNER, to prevent damage to the top of the sheet piles.
- F. Sheet piling driven to the required depth and extending above the specified top of wall elevations, as indicated on the Contract Drawings, shall be trimmed off at the top of wall elevation noted on the Contract Drawings. The CONTRACTOR shall trim the tops of all damaged sheet piles, which interfere with the driving activities or detrimentally affect appearance, if exposed in the finished work.
- G. If piles driven to the required depth are too short to reach the required top elevation, said effected sheet piles shall be extended by splicing. CONTRACTOR shall submit its splicing procedures, as necessary and as part of its shop drawing submission.
- H. Each sheet pile shall be interlocked with adjoining sheet piles for its entire length. Where ball and socket interlocks are indicated on the Contract Drawings, piles shall be driven with the ball edge leading. Sheet piles driven out of interlock with adjacent sheet piles shall be removed and replaced with new sheet piles.
- I. If the driving of a sheet pile tends to drag an adjacent sheet pile below grade, it shall be reported to the REMEDIAL DESIGNER, prior to taking any corrective

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actions. Corrective actions shall be as approved by the REMEDIAL DESIGNER.

- J. Jetting of steel sheet pile section will not be permitted on this project.
- K. Where boulders or other obstructions render it impracticable to drive sheet piles to the required depth, CONTRACTOR shall stop further driving, and submit its procedures to remove the obstructions or propose a re-designed configuration.
- L. CONTRACTOR shall maintain and submit records of driving. Driving records shall include alignment and verticality checks, location of splices and inspection of splice welds, and shall note driving equipment used and locations and depths where difficulty in driving was encountered.
- M. The hammer selected to drive the sheet piles shall be shown to limit the induced stresses in the sheet piles to less than 90% of the yield stress of the pile material.
- N. Each pile section (or pair of sheets) shall not be driven more than five (5) feet ahead of the adjacent sections.
- O. Open socket ends shall be kept free of soil during driving.

3.03 SPLICES

- A. Splices in sheet piling, as approved by the REMEDIAL DESIGNER, shall be full-penetration butt-welded. No more than one (1) splice per sheet will be allowed. When adjacent piles are to be spliced, splices shall be staggered not less than ten (10) feet apart in elevation.
- B. Splices shall be fabricated to assure alignment of the spliced parts. Change in slope between parts spliced shall not exceed 1/500.
- C. CONTRACTOR shall utilize welding procedure in accordance with AWS D1.1. CONTRACTOR shall provide inspection of welding, and shall submit qualification records of welders and welding procedures.

3.04 SEALING

- A. All handling holes in the sheet pile shall be sealed using steel plate having the same thickness as the sheet pile. Steel plate shall be seal welded all around.
- B. All exposed interlock joints shall be sealed using Volclay Joint Seal as manufactured by American Colloid Company or approved equal. Application of joint seal shall be in accordance with the manufacturer's recommendations.

***** END OF SECTION *****

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**CONSTRUCTION QUALITY ASSURANCE PLAN
OPERABLE UNIT-2 (OU-2)
216 PATERSON PLANK RD. SUPERFUND SITE
CARLSTADT, NJ**

Prepared for:

216 Paterson Plank Road Cooperating PRP Group

Prepared by:

Golder Associates Inc.
200 Century Parkway, Suite C
Mt. Laurel, NJ 08054

May 2007

Project No.: 943-6222

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1.0 INTRODUCTION

1.1 Purpose and Scope

This Construction Quality Assurance Plan (CQAP) has been prepared by Golder Associates Inc. (Golder Associates) on behalf of the 216 Paterson Plank Road Cooperating PRP Group for the 216 Paterson Plank Road Superfund Site (Site) in Carlstadt, Bergen County, New Jersey. The purpose of this CQAP is to describe the quality assurance program that will be implemented during remediation activities associated with Operable Unit-2 (OU-2) in order to document that construction is completed in accordance with the intent of the Contract Drawings and Technical Specifications (hereinafter referred to as the Contract Documents). These activities include in situ treatment of the "hot spot", replacement of the sheet pile wall along Peach Island Creek, installation of a new groundwater extraction system, installation of a cap, and decommissioning of the interim remedy.

This CQAP describes the following elements:

- Responsibilities and authorities of all organizations and key personnel involved in the design and construction of the Remedial Action;
- Protocols for sampling and testing used to monitor construction;
- Identification of construction quality assurance (CQA) sampling; and,
- Reporting requirements for CQA activities including summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. In addition, provisions for final storage of all records are specified.

This CQAP addresses construction quality assurance (CQA), which differs from construction quality control (CQC). In general, CQA refers to measures taken by an independent third party hired by the owner, in this case the Group, to assess whether the Remedial Action Contractor (Contractor) is in compliance with the plans and specifications for a project. CQC refers to measures taken by the Contractor to determine compliance with the requirements for materials and workmanship, as stated in the plans and specifications for the project. This CQAP is independent of CQC programs conducted by manufacturers and the Contractor and its subcontractors, which are described in the Technical Specifications.

This CQAP addresses the construction of the landfill cap, in situ treatment of the "hot spot", streambank enhancements along Peach Island Creek, and upgrading the existing groundwater recovery system. Specifically, this CQAP addresses the preparation of the soil subgrade, the

geosynthetic components of the cap system, the cover soil layer placed directly above the geosynthetic cap, stormwater management features, installation of a new sheet pile wall, and the extraction system wells and piping, including associated penetrations through the geosynthetic cap, verification that in situ "hot spot" treatment meets the treatment specifications, and demolition and decommissioning of the on site building and tank, and the current extraction system.

Details of materials, construction requirements, and procedures are included in the Technical Specifications, which are referenced by this CQAP.

1.2 Construction Quality Assurance Program

The CQA program is a planned system of activities that provides confirmation and documentation that a project is constructed in accordance with the intent of the Contract Documents. It includes inspections, verifications, audits, and evaluations of materials and workmanship necessary to determine and document the quality of the constructed work.

The basic components of the CQA program are:

- Preparation of a CQA Plan;
- Pre-construction review of project components;
- Conformance testing of geosynthetic and soil materials;
- Confirming and documenting survey control of final grades;
- Confirming and documenting testing of soil components during placement and compaction;
- Confirming and documenting construction of stormwater management features;
- Confirming and documenting construction of extraction system, piezometers, system controls and the sheet pile wall;
- Confirming and documenting demolition of building and tank, and decommissioning of current extraction system;
- Confirming and documenting proper completion of in situ "hot spot" treatment;
- Preparation of daily CQA reports;
- Review of technical and laboratory data;

- Final walk over and favorable review of the completed work; and,
- Preparation and submittal of a Final Record Documentation Report.

These CQAP guidelines provide for qualified personnel to monitor the progress and quality of construction. This program is intended to provide an objective overview of construction progress and identify potential deficiencies or problem areas during construction. The CQA program can also assist the Contractor in completing the project more efficiently by requiring compliance with the Contract Documents before the project proceeds to the extent where substantial work may have to be redone in order to correct a defect.

The CQAP identifies the personnel involved in CQA, and describes roles and responsibilities of the associated parties, QA reporting and record storage requirements. The CQAP also calls for a narrative describing construction, test results, and record drawings to be compiled into a Final Record Documentation Report signed by a Professional Engineer, registered in the State of New Jersey, which certifies that the portions of construction covered by the CQAP were completed in general conformance with the Contract Drawings, Technical Specifications, and approved modifications.

1.3 Project Documents

The following Project Documents were utilized for the preparation of this CQAP:

- "Preliminary (35%) Design Report" prepared by Golder Associates dated December 2005;
- Technical Specifications prepared for the Pre-Final (95%) Design Report by Golder Associates, dated October 2006; and,
- Design Drawings prepared for the Pre-Final (95%) Design Report by Golder Associates, dated October 2006.

2.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

This section describes the organization and individual responsibilities during the implementation of the Remedy.

2.1 216 Paterson Plank Road Cooperating PRP Group

The Group is responsible for the overall implementation of the OU-2 Remedy described in the Pre-Final Design Report, including in situ treatment of the "hot spot", streambank enhancements along Peach Island Creek, installation of a cap and replacement of the groundwater extraction system. The Group must comply with the requirements of the United States Environmental Protection Agency (USEPA) and demonstrate, by submission of CQA documentation, that the construction was performed as specified in the design. The Group will retain design, CQA, and construction organizations to accomplish the work and will have the authority to hire and fire these organizations. The Group also has the authority to accept or reject CQA plans, reports, and recommendations of the Quality Assurance Officer (QAO), and the materials and workmanship of the Contractor or their subcontractor(s).

2.2 Regulatory Agency

The USEPA is overseeing the completion of the landfill closure through the CERCLA program. It is the responsibility of the USEPA to review the Group's plans for compliance with the regulatory requirements for this Site. The USEPA also has the authority to review all CQA documentation during or after construction to confirm that procedures outlined in this CQAP were followed, and that the construction was performed as specified in the design. These activities may involve on-site inspections or testing independent of the CQA program.

2.3 Group's Representative

The Group's Representative, or Representatives, is (are) directly responsible for the construction contract administration and for the management of this project for the Group. The Group's Representative acts as a liaison and is in direct communication with the QAO, the Contractor, and subcontractors. General responsibilities of the Group's Representative will include:

-
- Prepare an agenda for, preside at, and record project meeting minutes, including pre-construction and regular (i.e. weekly or as otherwise specified) progress meetings, substantial completion, or other meetings, as necessary;
 - Monitor and coordinate the Contractor's work in relation to the schedule and conformance to the Contract Documents;
 - Document that the required quality control (QC) testing has been performed in accordance with the Technical Specifications and report data to the Remedial Designer and QAO;
 - Receive and review shop drawings and other material submittals from the Contractor and submit to the Remedial Designer for review. Coordinate with the Contractor to incorporate the Remedial Designer review comments;
 - Schedule and coordinate CQA monitoring activities with the QAO;
 - Coordinate any proposed substantive changes with the Remedial Designer, QAO, and Contractor;
 - Coordinate any design clarifications or interpretations with the Remedial Designer and Contractor;
 - Prepare periodic construction progress reports for distribution to the project team; and,
 - Maintain on-site project record drawings and project files for storing of originals or copies of reports generated during construction.

2.4 Remedial Action Contractor

During the bidding process, the Group will select a qualified Remedial Action Contractor (Contractor) to undertake the types of construction activities to be implemented.

The Contractor will assign a Project Superintendent as the responsible person in charge of all aspects of the project. The Project Superintendent will have a background in engineering or construction management with experience in construction and contract administration. The Contractor will be responsible for constructing the work in accordance with the Contract Documents and implementation of the Health and Safety Plan.

The Contractor may engage various subcontractors to implement certain specialized portions of the work, such as, the geosynthetics installations and in situ "hot spot" treatment. The subcontractors will provide a field supervisor who will report directly to the Contractor Project Superintendent.

Upon completion of the project, the Contractor will provide record drawings to the Group's Representative, Remedial Designer, and QAO for review.

2.5 Remedial Designer

The responsibilities of the Remedial Designer during implementation of the Remedy include the following:

- Review all proposed design and specification changes;
- Provide clarifications to the Contract Drawings and Technical Specifications, as necessary;
- Review submittals required by the Contract Drawings and Technical Specifications, including quality control tests; and,
- Participate in the pre-construction, substantial completion, and regular progress meetings to review construction activities and conformance with the intent of the remedial design.

Design and specification changes will be transmitted through the Remedial Designer for review and approval. The Remedial Designer will evaluate proposed materials and construction changes during construction for compliance with the intent of the Contract Drawings and Technical Specifications.

2.6 Quality Assurance Officer

The QAO will be responsible for overseeing and implementing this CQAP. The QAO will perform the CQA tasks required by this CQAP, and will confirm and document that the project construction has been completed in general conformance with the Contract Documents. The QAO will have the authority to reject materials and workmanship provided by the Contractor that are not in compliance with the Contract Documents. Responsibilities of the QAO for construction activities identified in this CQAP include the following:

- Review of the Contract Drawings, Technical Specifications, and related workplans and submittals to verify compliance with CQAP requirements;
- Work with the Group's Representative to review construction activities with the Contractor;
- Attend regular (e.g., weekly) project status meetings;
- Coordinate and schedule CQA testing with construction activities;

-
- Observe the CQC operations performed by the Contractor and its subcontractors;
 - Review, in conjunction with the Remedial Designer and the Group's Representative, corrective measures to be implemented during construction when deviations from the CQAP occur;
 - Observe CQC activities to help ensure that testing and documentation are complete, accurate and in general accordance with the Contract Documents;
 - Evaluate the soils, geosynthetics, and other testing laboratories for the project;
 - Observe and document placement and compaction of fill and backfill;
 - Observe and document geosynthetic material placement, non-destructive and destructive seam testing, and seaming and repair operations;
 - Observe and document sample collection following in situ "hot spot" treatment;
 - Observe and document completion of the streambank enhancements, including installation of the new sheet pile wall;
 - Observe and document installation of the enhanced groundwater extraction system and controls;
 - Observe and document demolition of on site building and storage tank, and decommissioning of current extraction system;
 - Work with the Group's Representative to determine that testing equipment used and tests performed are in accordance with the Technical Specifications and industry standards;
 - Observe, document, and report on CQC tests;
 - Report any identified deficiencies, not satisfactorily corrected by the Contractor, to the Group's Representative and Remedial Designer;
 - Prepare daily CQA reports;
 - Maintain an on-site project file for storing the originals or copies of all CQC reports and CQA test data sheets and reports generated during construction;
 - Verify performance of as-built surveying by the Contractor in accordance with the Contract Documents; and,
 - Prepare the Final Record Documentation Report at the completion of the project.

3.0 CONSTRUCTION ACTIVITIES

The following is a brief discussion of the Contractor's major remedial construction activities to be monitored by the QAO.

3.1 Earthwork

Earthwork activities include:

- Clearing and grubbing of the existing vegetation on the Site;
- Regrading of the landfill to provide minimum slopes;
- Placement of a grading layer in the cap area;
- Preparation and maintenance of the subgrade prior to geosynthetics installation;
- Placement of protective soil layer cover and vegetative support layer over the geosynthetics;
- Placement of riprap and coarse aggregate;
- Installation of surface water management structures, and;
- Completion of a site access road.

3.2 Geosynthetics

Geosynthetics installation activities include:

- Installation and seaming of the geosynthetic clay liner (GCL), geocomposite drainage layer, and geomembrane components of the cap;
- Installation of "boot" seals around geomembrane penetrations for the groundwater extraction system and other penetrations; and
- Installation and seaming of geotextile components of the cap and surface water management features.

3.3 Enhanced Groundwater Extraction System

Enhanced groundwater extraction system activities include:

- Drilling activities for installation of the new groundwater extraction system, including extraction wells and piezometers and control systems;
- Demolition of building currently on site;
- Construction of a pre-fabricated building and new tank on the slab from the demolished building; and,
- Decommissioning and dismantling the current groundwater extraction system including all above ground pipes, the above ground storage tank and control system.

3.4 In Situ "Hot Spot" Treatment

In situ treatment of the "hot spot" will include:

- Completion of the field verification program establishing rates for in situ air stripping (ISAS) and in situ stabilization (ISS) advancement / penetration, ISAS mixing times, and quality control testing requirements;
- Air stripping by mixing of soil while injecting air to remove VOCs,
- In situ solidification / stabilization using a cement / lime mixture; and,
- Verification that VOC removal meets requirements.

3.5 Streambank Enhancements

Streambank enhancements will include:

- Installation of a new sheet pile wall;
- Removal of fill material between the new and old sheet piles walls; and,
- Removal of the old sheet pile wall and H-buttresses at low water level of Peach Island Creek.

3.6 Miscellaneous

In addition to the activities described above, additional miscellaneous activities are also required, including:

- Installation of new fencing and gates;
- Establishment of permanent vegetation on the completed landfill cap and other areas disturbed by construction activities; and,
- Installation of stormwater management features including surface water control and perimeter channels, culverts in the sheet pile wall, and associated riprap aprons.

4.0 QUALITY ASSURANCE DOCUMENTATION

The following sections present minimum requirements of the CQA monitoring and testing documentation program to be performed by the QAO. This monitoring and testing program is intended to supplement requirements described in the Technical Specifications. In the event of any discrepancies the Remedial Designer shall be notified to clarify the appropriate requirements.

4.1 Earthwork

The earthwork CQA testing program consists of pre-construction and construction testing of native and imported soil such as grading fill, backfill, structural fill, geocomposite drainage layer, cover soil, vegetative support layer, and aggregate materials. The characteristics of these fill and soil types are defined in the Technical Specifications. Prior to and during construction, each soil type will be evaluated to determine whether it meets the requirements. Soil samples will be obtained in accordance with American Society for Testing and Materials (ASTM) standards ASTM D75 and ASTM D420, and will be tested by a geotechnical testing laboratory approved by the Remedial Designer.

4.1.1 Pre-Construction Testing

Pre-construction testing will be performed by the QAO on the imported materials to determine whether they meet requirements listed in the Technical Specifications. Soil samples will be provided from each proposed source. The specific tests to be performed by the QAO, and testing frequency will be done according to Table 4-1 below, or according Technical Specification if no testing is indicated in the Table.

**TABLE 4-1
PRE-CONSTRUCTION TESTING MINIMUM FREQUENCIES¹**

| Test and Method | Grading Fill (cy) | Cover Soil (cy) | Vegetative Support Layer (cy) | Structural Fill (cy) |
|--|-------------------|-----------------|-------------------------------|----------------------|
| Particle Size ² (ASTM D422, C117, C136) | 5,000 | 5,000 | 5,000 | 5,000 |
| Atterberg Limits ³ (ASTM D4318) | 5,000 | 5,000 | — | 5,000 |
| Moisture Content ⁴ (ASTM D2216 or D4643) | 5,000 | 5,000 | 5,000 | 5,000 |
| Standard Proctor (ASTM D698) | 10,000 | — | — | 10,000 |

| Test and Method | Grading Fill (cy) | Cover Soil (cy) | Vegetative Support Layer (cy) | Structural Fill (cy) |
|--|-------------------|-----------------|-------------------------------|----------------------|
| pH (ASTM D4972) | --- | --- | 5,000 | --- |
| Organic Content (ASTM D2974) | --- | --- | 5,000 | --- |
| Specific Gravity (ASTM D854) | 10,000 | --- | --- | 10,000 |
| Soil Fertility (Baker or LaMotte Test) | --- | --- | 5,000 | --- |

¹Specific frequency refers to one test per the presented volume or one per material type or source, whichever is greater.

²ASTM D422 is applicable for fill, cover soil, and vegetative support layer. ASTM C117 and C136 are applicable to all other soil construction materials. Use the USCS for description and identification (ASTM D2488).

³For cohesive soils only.

⁴Natural moisture content.

4.1.2 Construction Testing

The tests to be performed by the QAO during construction for each material type, and frequency of those tests will be completed according to Table 4-2 below, or according Technical Specification if no testing is indicated in the Table.

TABLE 4-2
CONSTRUCTION TESTING - MINIMUM FREQUENCIES¹

| Test and Method | Vegetative Support/Cover Soil Layers | Grading Fill | Structural Fill (cy) |
|-------------------------------|--------------------------------------|----------------|----------------------|
| In-Place Density (ASTM D2922) | --- | 10,000 sf/lift | 10,000 sf/lift |
| Moisture Content (ASTM D3017) | --- | 10,000 sf/lift | 10,000 sf/lift |
| Thickness ² | 10,000 sf | 10,000 sf | 10,000 sf/lift |

¹ Specific frequency refers to one test per the presented frequency or one per material type, whichever is greater.

²Thickness shall be checked by excavating test holes.

In accordance with Sections 02223 and 02599 of the Specifications, grading fill and structural fill materials shall be placed and compacted to achieve a minimum density of 90 percent of maximum dry density as determined by the Standard Proctor test (ASTM D698). Care shall be taken not to damage other portions of the Work during compaction of backfill, or proof-rolling. The moisture content of the grading fill and structural fill shall be such as defined in the Specifications. Puddling or jetting for compaction will not be permitted. Compaction testing of each lift of backfill and fill will be completed. If the Contractor makes reasonable efforts, as determined by the QAO, to achieve the

specified percent compaction but cannot meet the compaction requirement, an alternate percent recompaction, agreed upon by the Group's Representative and Remedial Designer, may be utilized.

Compaction of cover soil above the geocomposite drainage layer shall be achieved in accordance with the Technical Specifications.

4.1.3 Construction Monitoring

All earthwork will be monitored by the QAO to confirm and document that the construction is performed in general accordance with the Contract Documents. The Contractor will be responsible for establishing the design lines and grades. Visual observations or surveying by the Contractor, as appropriate, throughout the construction process, will be conducted and submitted to the QAO to evaluate whether the materials are placed to the lines and grades shown on the Contract Drawings.

4.2 Geosynthetics

The CQC requirements for the geosynthetics are listed in the Technical Specifications. The CQA program for geosynthetics consists of the Remedial Designer reviewing the Geosynthetics Installer's QC submittals, material conformance testing, construction monitoring, and testing. The types of geosynthetics used in the construction of the Remedy include geosynthetic clay liner (GCL), geomembrane, woven and non-woven geotextiles, and geocomposite drainage layer.

The geosynthetic QC submittals and material conformance testing requirements are defined in the Technical Specifications. Prior to and during construction, these geosynthetics will be sampled and tested to determine whether the materials meet the requirements listed in the Technical Specifications. Testing will be performed by a GeoSynthetics Institute (GSI) accredited Geosynthetics Laboratory, as approved by the Remedial Designer.

4.2.1 Conformance Testing

Prior to geosynthetics installation, samples of the geosynthetics will be obtained for conformance testing by the QAO. The conformance testing minimum frequency will be at a rate of 1 per 100,000 square feet from material delivered to the Site, or one sample per lot, whichever results in the greater number of conformance samples. Samples will be taken in accordance with applicable Technical Specifications. The QAO will mark the machine direction, roll number, lot number, date of manufacturer, manufacturer name, project specific information, and date the sample was obtained on the sample and forward the sample to the approved geosynthetics laboratory. The minimum required Geosynthetic conformance tests are described in the Technical Specifications and are summarized in Tables 4-3, 4-4, 4-5, and 4-6.

**TABLE 4-3
GCL CONFORMANCE TESTING**

| Test | Test Method | Frequency (sf) ¹ |
|--|-------------|-----------------------------|
| Bentonite Content (at 0 percent moisture) | ASTM D5993 | 1/100,000 |
| Hydraulic Conductivity (at 3 psi confirming pressure) | ASTM D5084 | 1/100,000 |
| Grab Tensile Strength | ASTM D4632 | 1/100,000 |
| Peel Strength | ASTM D6496 | 1/100,000 |

¹Specified frequency or one per lot, whichever is greater.

**TABLE 4-4
GEOMEMBRANE CONFORMANCE TESTING**

| Test | Test Method | Frequency (sf) ¹ |
|-------------------------|------------------|-----------------------------|
| Density | ASTM D792/D1505 | 1/100,000 |
| Carbon Black Content | ASTM D1603 | 1/100,000 |
| Thickness | ASTM D5199/5994 | 1/100,000 |
| Tensile Properties | ASTM D6693 | 1/100,000 |
| Puncture Resistance | ASTM D4833 | 1/100,000 |
| Carbon Black Dispersion | ASTM D5596 | 1/100,000 |
| Tear Resistance | ASTM D1004 Die C | 1/100,000 |

¹Specified frequency or one per lot, whichever is greater.

**TABLE 4-5
GEOTEXTILE CONFORMANCE TESTING AND FREQUENCIES**

| Test | Test Method | Frequency (sf) ¹ |
|--------------------------------------|-------------|-----------------------------|
| Mass per unit area | ASTM D5261 | 1/100,000 |
| Grab Tensile Strength and Elongation | ASTM D4632 | 1/100,000 |
| Puncture strength | ASTM D4833 | 1/100,000 |
| Mullen Burst | ASTM D3786 | 1/100,000 |
| Trapezoidal Tear | ASTM D4533 | 1/100,000 |
| Apparent Opening Size ² | ASTM D4751 | 1/100,000 |

¹Specified frequency or one per lot, whichever is greater.

²For filter applications only

**TABLE 4-6
GEOCOMPOSITE CONFORMANCE TESTING AND FREQUENCIES**

| Test | Test Method | Frequency (sf) ¹ |
|--|--------------------|-----------------------------|
| Geonet Thickness | ASTM D5199 | 1/100,000 |
| Adhesion Strength | ASTM F904 modified | 1/100,000 |
| Geotextile AOS (upper component only) | ASTM 4751 | 1/100,000 |
| Transmissivity | ASTM D4716 | 1/100,000 |

¹Specified frequency or one per lot, whichever is greater.

All conformance tests will be performed in accordance with the Technical Specifications. The QAO will review the test results and will report any nonconformance to the Group's Representative, the Remedial Designer, and the Contractor.

4.2.2 Construction Monitoring and Testing

All geosynthetic components will be monitored during installation. The QAO will review surveying information developed and submitted by the Contractor throughout the construction process to evaluate whether materials are placed to the lines and grades as shown on the Contract Drawings.

The QAO will review the following Contractor's Geosynthetics Installer documentation:

- CQC documentation recorded during installation;

- Daily reports detailing the personnel present on-site, the progress of the work, the arrival of materials, and any problems encountered; and,
- Subgrade surface acceptance certificates for each area to be covered by the geosynthetics, signed by the Geosynthetics Installer's Superintendent and the Contractor.

The QAO will observe and document the following items related to geosynthetics installation:

- Delivery and unloading of geosynthetic materials at the Site to verify that the materials are in good condition and properly labeled;
- Geosynthetic storage area shall be uniform and free of possible sources of damage, such as mud, dirt, debris, and dust, and meet all Technical Specification requirements;
- Geosynthetic packaging identification slips for verification and generation of an on-site materials inventory;
- Subgrade conditions prior to geosynthetics installation. Verify that any identified deficiencies (e.g., surface irregularities, loose soil, protrusions, in-place construction stakes, excessively soft areas, stones, desiccation cracks) are corrected;
- Lines and grades have been verified by the Contractor's surveyor;
- Handling of geosynthetic materials from storage to the work area;
- Temporary and permanent anchoring of geosynthetics; and,
- Required overlap distances are maintained.

4.2.3 GCL Monitoring

During shipment and storage, the GCL shall be wrapped in protective heavy-duty plastic or similar protective covering to prevent damage. Upon arrival to the Site, the QAO will inspect the material for damage. Rolls found to be damaged will be rejected. Materials will be stored in a dry location, free from disturbance and protected from moisture, soil, mud, dust, debris, traffic and vandalism.

Subgrade Condition

Prior to GCL placement, the QAO shall confirm that the subgrade surface is in an acceptable condition by walking the prepared subgrade with the GCL installer and reviewing the subgrade acceptance certification prepared by the installer. Foreign materials and protrusions shall be

removed. Cracks and voids shall be filled and the surface shall be smooth and uniformly sloping with no sharp grade breaks. The receiving soil surface shall be compacted in accordance with the Technical Specifications.

Prior to installation, the QAO shall confirm and document that the grades upon which the GCL is to be deployed are in agreement with those presented on the Contract Drawings, or are acceptable to the Remedial Designer, if they differ from the proposed grades. A Professional Surveyor licensed in the State of New Jersey, employed by the Contractor shall survey these grades and copies of the survey shall be provided to the QAO for review.

Installation

Installation of the GCL shall be performed to prevent damage to the underlying grading layer and the GCL itself and in accordance with the Technical Specifications. Heavy construction equipment shall not be operated directly on the GCL.

The following will be confirmed and documented by the QAO during the installation of the GCL:

- Placement of GCL is in accordance with the Specifications;
- Materials is not damaged during deployment;
- Only GCL being placed that day will be unwrapped;
- Geomembrane shall be placed immediately upon the GCL;
- GCL shall be kept dry and not be installed in standing water or during any precipitation or high winds;
- Overlapping of GCL is in accordance with the Technical Specifications;
- No soil or debris shall be entrapped in the overlapping zone;
- No hydrated edges of previously placed GCL are present at overlap of new work areas;
- Rolls deployed match the roll numbers of the manufacturer's quality control testing;
- GCL shall be inspected continuously for damage and shall be repaired or replaced, if defective, and,
- Placement of overlying materials shall be performed without damage to GCL.

4.2.4 Geomembrane Monitoring and Testing

During installation, the QAO will observe the Contractor's geomembrane deployment, trial seams, field seams, non-destructive and destructive seam testing, and repairs to document that the installation is in general accordance with the Technical Specifications.

Deployment

The QAO will verify that only favorably reviewed materials are used, that each panel is given a unique panel number, geomembrane is not placed during inclement or other unsuitable weather conditions, the geomembrane is not damaged during installation, and anchoring is performed in accordance with the Technical Specifications and Contract Drawings. The QAO will record pertinent information pertaining to deployment including seam number, roll number, date, visual panel condition, seam overlaps, and length of wide of panel.

Trial Seams

The QAO will verify that seaming conditions are adequate, tests are performed at required intervals, specified test procedures are followed, and that retests are performed in accordance with the Technical Specifications. The Geosynthetics Installer will perform pre-weld testing (trial seaming) at the beginning of each crew shift, every five hours thereafter, after an equipment shutdown, and immediately following any work stoppage of one hour or more, or changes in seaming process. Seaming operations will not commence until the QAO has determined that the seaming process is meeting the Technical Specification requirements and is acceptable. Visual observation of the trial seam by the QAO is required. The QAO will mark the test weld with date, ambient temperature, welding machine number, welding technician initials, machine temperature, and speed. For extrusion welding, the QAO will record the nozzle and extrusion settings. The trial seam sample will be archived by the QAO at the Site. The QAO will record the trial seam test results as passing or failing, as well as peel strength values and failure mode based on ASTM D6392.

Field Seaming

The QAO will verify that only favorably reviewed equipment and personnel perform welding, all welding is performed under suitable conditions as per the specifications, specified overlaps are achieved, seams are oriented in accordance with project requirements, and that grinding

techniques and extrudate meet project requirements for extrusion welding. The QAO will record pertinent information pertaining to field seaming, including date, time, seam length, welder identification, welding device, ambient temperature, nozzle or wedge setting and actual temperature, and wedge speed.

Non-Destructive Seam Continuity Testing

The QAO will verify that all seam lengths are non-destructively tested by the Contractor in accordance with the Technical Specifications. If the seam cannot be tested, the QAO will observe cap strip operations and verify that test equipment and gauges are functioning properly and that test procedures are in accordance with the project requirements. The QAO will verify that all failing seam lengths are repaired and re-tested until passing results are achieved. The QAO will record all pertinent data relating to non-destructive testing. For air pressure testing, this includes date, start and end times, initial and final pressure, seam segment, and indication of pass or fail. For vacuum testing, this includes date, seam segment, QC technician, and indication of pass or fail.

Destructive Seam Testing

The Contractor's Geosynthetic Installer will furnish destructive testing samples of the field seamed geomembrane in accordance with the Technical Specifications, at locations selected by the QAO. The samples will be taken and prioritized as follows:

- Areas identified as suspect during seaming or non-destructive testing/monitoring;
- A minimum of one sample for each geomembrane seamer;
- A minimum of one sample for each representative working conditions (e.g., weather conditions); and,
- A minimum of one sample for every 500 linear feet of seaming.

Two specimens shall be cut from the field seam at the location indicated by the QAO and in accordance with the Technical Specifications, with the seam centered parallel to the specimen width. The distance between these two specimens shall be forty-two (42) inches measured along the seam. Both specimens will be cut and tested for peel adhesion in accordance with the Technical Specifications. The installer shall provide the test results to the QAO upon completion of the tests.

If the specimen fails, the Geosynthetic Installer will follow the requirements of the Technical Specifications for tracking and repair of failed destructive test samples. A minimum of four of the five samples must meet the minimum peel and shear criteria listed in the Technical Specifications. Both tracks of double-track fusion seams will be destructively tested for peel.

Failed seams will be tracked according to the welding apparatus and the machine operator. Samples taken as a result of failed tests will not be counted toward the total number of destructive tests required. All failed field seams must be documented to be bounded on both sides by passing destructive tests. The results of laboratory destructive tests conducted by the QAO will govern the acceptability of seams.

The Geosynthetics Installer shall be responsible for patching all areas cut for test samples and for non-destructive testing (e.g. vacuum box, etc.) in accordance with the Technical Specifications. The QAO will observe this work and record test locations, results, actions taken in conjunction with destructive test failures, and repairs.

Repairs

The QAO shall observe and document that all materials, techniques, and procedures used for repairs are favorably reviewed in advance. The QAO will verify that all repairs are marked, recorded, tested, and that wrinkles are addressed, prior to being covered by other materials. The QAO will record pertinent data relating to the locations of defects and repairs as specified in the Technical Specifications, including date and time repaired, seam segment/location, defect type, repair type and dimensions, welder identification, welding device, and date and result of nondestructive testing.

4.2.5 Geotextile and Geocomposite Monitoring

During geotextile and geocomposite installation, the QAO will observe the Contractor's deployment, field seaming, and repairs, and document whether the Contractor's installation is in accordance with the Technical Specifications.

Deployment

The QAO will verify that the underlying layers are clean and free of deleterious materials prior to deployment, anchoring is achieved as specified, methods are used to minimize wrinkles, and underlying layers are protected during cutting of materials.

Seams

The QAO will verify sufficient seam overlap and that the specified seam procedures are followed as required in the Technical Specifications.

Repairs

The QAO will verify that all repairs are performed in accordance with project Technical Specifications.

Protection

The QAO will verify that geotextiles and geocomposites shall be covered within the maximum exposure time recommended by the manufacturer, but in no case longer than 30 days following placement.

4.3 Enhanced Groundwater Extraction System

The following describes the CQA procedures to be implemented during the Contractor's installation of the extraction wells, piezometers, pre-fabricated building, and storage tank as shown on the Contract Drawings. Locations may be adjusted, if difficulty in drilling is encountered and if authorized by the QAO.

The QAO will observe the following activities during the Contractor's installation of the new extraction system:

- Start and completion date;
- Health and safety monitoring, including air monitoring;
- Inspection of materials, and receipt of material certifications as required by Technical Specifications;
- Extraction well and piezometer location;
- Type of drilling rig and equipment;

- Contractor measurement of airborne chemical concentrations in the working area;
- Logging of material types encountered during drilling;
- Measurement of the total drilling depth;
- Measurement of depth to encountered liquids, as applicable;
- Measurement of depth to bottom of the wells and piezometers;
- Monitoring of depth to pipe connections;
- Measurement of the depths to and lengths of perforated and solid sections of piping and well screens;
- Measurement of thickness of all components of the wells and piezometers (gravel, filter sand, bentonite plug);
- Measurement of the installed dimensions of installations above and below grade;
- Monitoring of the well-head assembly;
- Documenting that associated valves, casing pipes, and hardware are installed and operative;
- Final surveying of wells and piezometers;
- Observation and review of Contractor's quality control testing of concrete and compaction testing of soil and fill in accordance with Technical Specifications.
- Measurement of thickness, and placement and compaction of pipe bedding and backfill materials around the collection and conveyance pipes;
- Monitoring of joints and connections, alignment of pipe, and pipe boot connections;
- Observation of required pressure testing of the pipe;
- Installation of the control panels;
- Construction of the prefabricated building and tank according to the Technical specifications;
- Installation of control system for the groundwater extraction system; and
- System startup.

Mechanical/Electrical

The Contract Documents will require that the CONTRACTOR observe, in conformance with the Technical Specifications, Contract Drawings, and Manufacturer guidelines, the mechanical and electrical equipment installation for the groundwater extraction system. The CONTRACTOR will submit manufacturer operations manuals, guidelines, and other pertinent information for inclusion in the project Operations and Maintenance Manual.

The following activities by the QAO are anticipated:

- Observe the installation of pneumatic operation system for pumps, including compressor and building, and electrical supply for controls and inspect it for physical defects;
- Observe mechanical checkout by the CONTRACTOR; and,
- Review field calibration sheets for all field instrumentation such as level sensors.

At a minimum, the CONTRACTOR will perform and submit documentation for the following:

- Submit calibration sheets for all instrumentation;
- Complete a mechanical checkout of all electrical equipment;
- Submit as-built information regarding location, connections, and controls; and,
- Submit warranties on all applicable products.

Demolition / Decommissioning

The QAO will observe the following activities during the Contractor's demolition/ decommissioning of the current extraction system, building and tank on site to verify they are completed in compliance with the Technical Specifications:

- Abatement of regulated materials within the building;
- Demolition of the building;
- Draining of current extraction system;
- Decommissioning of current extraction system piping and control system;
- Waste storage and disposal;
- Disconnection and capping of designated utilities; and
- Backfilling and regrading of disturbed areas.

Any significant deviation by the Contractor from the Technical Specifications, Contract Drawings, or Manufacturer guidelines will be brought to the immediate attention of the Group's Representative and Remedial Designer, by the QAO.

4.4 Stormwater Management

The QAO will visually inspect the stormwater management features as they are installed, noting observation relative to the following:

- Tie-ins with the cap components;
- Culvert installation, including excavation, pipe placement and slope, bedding and backfill placement, and compaction;
- Measurement of channel dimensions;
- Survey layout and final survey, including checking that slopes are within ranges listed on the Contract Drawings;
- Anchoring of turf reinforcement mat;
- Use of approved materials; and,
- Adequate thickness lining of materials (e.g., riprap, reno mattress, etc.).

The QAO will perform required testing of fill and backfill associated with stormwater management features in accordance with Tables 4-1 and 4-2 and the Technical Specifications.

4.5 In Situ “Hot Spot” Treatment

The QA program for the “hot spot” treatment will consist of monitoring of the air stripping and in situ stabilization operations. The QAO will verify material certifications are obtained and reviewed as required by the Technical Specifications. The QAO will observe the following activities during the in situ treatment to ensure they are completed in accordance with the Technical Specifications:

- Delivery and storage of materials;
- Clearing and preparation of the work area;
- Survey of the “hot spot” area to determine treatment area;
- Completion of the field verification program establishing rates for in situ air stripping (ISAS) and in situ stabilization (ISS) advancement / penetration, ISAS mixing times, and quality control testing requirements;
- Establishment of column depths / elevations;
- Implementation of ISAS and ISS including, proper stability, handling of excess materials, construction in accordance with Contract Drawings, and completion of specified quality control measures;
- Recording of required field data; and
- Sample collection.

Sampling Requirements

The minimum tests to be performed by the Contractor during “hot spot” treatment, and frequency of those tests will be completed according to Tables 4-7 and 4-8 below, according to the Technical Specifications, or as directed by the Remedial Designer.

**TABLE 4-7
ISAS/ISS COLUMN CONTINUITY AND DEPTH CONTROL**

| Item/Test | Reference Test Standard | Frequency (min.) | Criteria |
|-------------------------------|-------------------------|------------------|---|
| Column Verticality | None | 1 per column | Within two (2) percent of vertical. |
| Column Depths/Elevations | None | 1 per column | Within two (2) inches of depths shown in the Contract Drawings. |
| Column Alignment (horizontal) | Survey | 1 per column | Within six (6) inches of the Contractor's approved ISAS/ISS Shop Drawing locations. |

**TABLE 4-8
ISS SLURRY MATERIAL CONTROL**

| Item/Test | Reference Test Standard | Frequency | Criteria |
|----------------------------|-------------------------|--------------|--|
| Injection Ratio | None | 1 per stroke | Ratio varies based on tailings conditions and workability. |
| Penetration Ratio | Visual | 1 per stroke | As required. |
| Slurry Material Proportion | None | 1 per stroke | Percentage of slurry material. |
| Slurry Material Uniformity | Visual | 1 per stroke | Visual appearance of mixture homogeneity. |

The QAO will verify that the Contractor uses approved sampling devices to sample mixed ISAS/ISS columns, and that sampling occurs prior to solidification of ISS slurry materials. Sample locations will be randomly distributed as directed by the Remedial Designer. After the quality control samples, have sufficiently cured, they shall be tested, in accordance with the Technical Specifications on-Site or at off-Site laboratories. If quality control samples are transported to designated, approved off-Site testing laboratories, those samples shall be transported under appropriate "chains-of-custody".

Failed QC Tests

As per the Technical Specifications, if any QC testing fails to comply with the specified performance criteria, the Contractor shall delineate the impacted ISAS/ISS treatment areas which do not comply. The Contractor shall then remedy these areas by re-mixing the associated columns or implementing alternate corrective actions, as approved by the Remedial Designer. Following corrective actions the Contractor shall perform additional QC testing to verify that the specified performance criteria have been achieved.

4.6 Streambank Enhancement – Peach Island Creek

The QA program for the streambank enhancements will consist of monitoring the installation of the new sheet pile wall, removal of fill between the old and new sheet pile wall, and cutting and removal of the old sheet pile wall at the Peach Island Creek water line. The QAO will verify receipt of all required material certifications as per the Technical Requirements. The QAO will observe the following activities:

- Installation of new sheet pile wall including:
 - Delivery, storage, and handling of materials;
 - Verification that the location, arrangement, and length of the steel sheets are in accordance with Contract Drawings;
 - Surveying of sheet piling locations;
 - Driving of sheet piles;
 - Verification that sheet piling is driven plumb and does not deviate from vertical by more than 1/8 inch per foot;
 - Implementation of corrective measures as needed; and
 - Proper installation of splices and sealing where necessary.

5.0 RECORDS AND REPORTING

5.1 Contract Drawings

The Contractors' Superintendent and the Group's Representative will each maintain on the Site one clean set of the Contract Drawings, Final Design Report, Technical Specifications, and other reports pertinent to the construction of the remedy, along with a record of all proposed, pending, and approved changes and clarifications to the Contract Documents. Additionally, the Contractor will maintain on-site, at all times, one set of marked-up Record Drawings indicating progress of construction.

5.2 Contract Submittals

Submittals required by this CQAP and the Technical Specifications will be logged in at the time of receipt by the Group's Representative. A record of the submittal and review form indicating favorable review or rejection of the submittal will be kept on file in the field by the QAO and at the office of the Remedial Designer. A copy indicating the final status will be returned to the Contractor for his files.

5.3 Daily Records

The QAO will keep records of construction and testing activities which, in conjunction with the Contractor's submittals and as-built drawings, will enable preparation of Record Drawings and the Final Record Documentation Report.

The QAO will prepare Daily Summary Reports, which will be numbered sequentially and will include the following:

- Date and project name;
- Weather conditions, including daily high and low temperature, wind conditions, and precipitation;
- General description of work activities at the Site;
- Description of work completed for the day, referencing stationing and grid coordinates, as appropriate;
- Identification of areas worked including lift number, panel number, and/or seam number;

- Reduced-scale drawings or sketches showing work completed;
- Summary of test samples taken, with locations and elevations, as appropriate;
- Summary of CQC test results, provided to the QAO by the Contractor, compared with Specification requirements and indication of pass or fail status for the samples;
- Test equipment calibrations, unless recorded in other field notebooks;
- List of off-site materials received;
- Summary of CQA and CQC procedures used for the day and list of CQA personnel on-site;
- Results of all CQA tests performed;
- Results of all laboratory test data received;
- Estimate of all materials placed or installed; and,
- Problems encountered and resolutions reached.

5.4 Construction Problem and Corrective Measure Reports

A construction problem is defined herein as material or workmanship that apparently does not meet the requirements of the Contract Documents. Construction Problem Reports will be prepared by the QAO and will be numbered sequentially. Each report will be cross-referenced to specific monitoring and testing data sheets where the problem was identified. Corrective Measures Reports shall be prepared by the QAO following correction of the problem and will be correlated to the associated Construction Problem Report. These reports will include the following information:

- Detailed description of the problem;
- Location and probable cause of the problem;
- How and when the situation was identified;
- How the problem was corrected or resolved;
- Any measures taken to prevent similar problems in the future; and,
- Signatures of QAO, the Group's Representative, and Contractor's Superintendent.

5.5 Photographic Records

The QAO will take photographs identified by date, time, location, and name of person taking the photograph. Photographic record sheets will be completed to organize the photographs. Such sheets will be numbered sequentially and will include the following information:

- The date, time, and location where the photograph was taken and weather conditions;
- The size, scale, and orientation of the subject matter photographed;
- Location and description of the work;
- The purpose of the photograph; and,
- Initials of the photographer.

5.6 Final Record Documentation Report

Within 90 days of completion of construction, the QAO, Remedial Designer, and the Group's Representative will complete the Final Record Documentation Report (Report) for the project. The Report, submitted to the USEPA, will certify that, based on the QAO's observations of the Contractor's work and on evaluation of furnished test results and other information, the Contractor's work has been completed in substantial conformance with the Contract Drawings, Technical Specifications, with any significant exceptions noted. The report will include the following:

- Narrative description of construction activities completed at the Site;
- Description of material deviations from the Contract Documents requirements and justification for such changes;
- Description of CQA testing procedures;
- Summary of CQA test data including summary tables of all soil and geosynthetics monitoring and test results;
- Maps and drawings showing CQA test and sample locations, if appropriate;
- Descriptions of procedures used by the Contractor to rework or repair areas with failing CQA test results;
- Color photographs of major project features;

- As-built plans and details of the completed construction, prepared by the Contractor;
- Certification statement for portions of the work monitored by the QAO that the construction was completed in substantial accordance with the Contract Documents.

5.7 Records Storage

Throughout the construction, original documents or copies will be kept in an organized file on-site. All records and documents relating to the Remedial Action will be preserved and retained for a minimum of 10 years following receipt from USEPA of a Certificate of Completion of the Work. At the close of this 10-year period, documents may be destroyed with USEPA concurrence in accordance with the procedures outlined in the Consent Decree.

6.0 PLAN MODIFICATION PROCEDURE

Should this CQAP require modification, the proposed change will be submitted in writing to the Remedial Designer and the Group's Representative for review. If the proposed modification is deemed to be appropriate, a letter requesting approval of the change will be submitted to the USEPA. An addendum will be attached to all copies of the CQAP following receipt of approval from the USEPA.

GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE
TREATABILITY STUDY
FINAL REPORT

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JULY 2000

**GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE
TREATABILITY STUDY
FINAL REPORT**

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ACRONYMS AND ABBREVIATIONS

| | |
|---------------------|--|
| ASTM | American Society for Testing and Materials |
| cm/sec | Centimeters per second |
| °C | Degrees Celsius |
| DQOs | Data Quality Objectives |
| EPA | Environmental Protection Agency |
| ft | Foot |
| ft ³ | Cubic foot |
| in | Inch |
| in ² | Square Inch |
| L | Liter |
| lb | Pound |
| lbs/ft ³ | Pounds per cubic foot |
| lbs/in ² | Pounds per square inch |
| MDL | Method Detection Limit |
| mg | Milligram |
| mg/kg | Milligram per kilogram or ppm |
| mg/L | Milligram per Liter or ppm |
| mL | Milliliter |
| ND | Not Detected |
| PID | Photoionization Detector |
| ppb | Parts per billion |
| ppm | Parts per million |
| PRPs | Potentially Responsible Parties |
| QA | Quality Assurance |
| QC | Quality Control |
| RCRA | Resource Conservation and Recovery Act |
| rpm | Rotations per minute |
| SVOC | Semivolatile Organic Compounds |
| TCLP | Toxicity Characteristic Leachate Procedure |
| UCS | Unconfined Compressive Strength |
| VOC | Volatile Organic Compounds |
| ug | Microgram |
| ug/kg | Microgram per kilogram or ppb |
| ug/L | Microgram per Liter or ppb |

**216 PATERSON PLANK ROAD SITE
BENCH-SCALE STABILIZATION
TREATABILITY STUDY
FINAL REPORT**

1.0 INTRODUCTION

1.1 TERMS OF REFERENCE

This report is a presentation of the results of the stabilization treatability study conducted for Golder Associates, Inc. (Golder) on materials sampled from the 216 Paterson Plank Road site located in Carlstadt, New Jersey (the site). The treatability study was performed to determine the potential for 1) in-situ air stripping treatment, 2) in-situ stabilization / solidification (s/s) treatment using Portland cement and/or clay, and 3) in-situ s/s treatment using Portland cement and/or clay amended with zero-valent iron. This report was developed to present the testing protocols and results of treatability testing performed by Kiber.

1.2 SCOPE OF WORK

All testing was performed in general accordance with the Scope of Work presented in Golder's Request for Proposal (RFP) dated 23 September 1998 and Kiber's cost proposal dated 15 October 1999.

The treatability study outlined by Kiber, and Golder consisted of Phase I: Baseline Characterization, Phase II: Screening Tests, Phase III: Intermediate Tests and Phase IV: Verification Tests. Specific goals and objectives identified in the Scope of Work include:

- Evaluate the effectiveness of air stripping for reducing volatile organic concentrations prior to the introduction of the various s/s reagents.
- Identify formulations using cement and/or clay based s/s reagents that will provide the desired strength and physical characteristics.
- Evaluate the reduction in total constituent concentration achieved by the selected s/s reagent formulations.

- Evaluate the reduction in constituent mobility provided by the selected s/s reagent formulations
- Evaluate whether zero-valent iron amendments provide additional reduction in total constituent concentrations.

This report was developed to present the results of all testing performed throughout the treatability study.

1.3 REPORT ORGANIZATION

The final report presents the sample tracking information, the test methods and protocols, and the results of analyses and testing conducted throughout the treatability study. Section 2.0 presents information regarding Phase I: Baseline Characterization. This section includes information pertaining to untreated material receipt and handling, sample preparation and analytical and geotechnical evaluations of the untreated material. All information and results associated with Phase II: Screening Tests are presented in Section 3.0. Section 4.0 presents the results of Phase III: Intermediate Tests. The results of Phase IV: Verification Testing are presented in Section 5.0. Section 6.0 presents Kiber's Quality Assurance (QA) and Quality Control (QC) procedures for the treatability study. Following the main text are tables presenting the results of all testing performed. Appendices are presented at the end of the document and include analytical data packages and geotechnical data reports. Note that complete analytical data packages including all raw data and additional summary sheets can be made available upon request.

2.0 PHASE I: BASELINE CHARACTERIZATION

2.1 OVERVIEW

The establishment of the baseline level of constituents is important for comparing and determining the effectiveness of s/s treatment. The analyses also allow Kiber to verify that the samples are representative and consistent with previous samples and materials, and those present at the site. This section presents information on the sampling, handling, preparation and characterization of the untreated material utilized during the treatability study.

2.2 MATERIAL SAMPLING AND RECEIPT

On 4 November 1999, Kiber received a total of ten 2-gallon buckets from the site. Three buckets were labeled GB-06, three buckets were labeled GB-07 and four buckets were labeled GB-06/07. The untreated materials were collected from the 216 Paterson Plank Road site in Carlstadt, New Jersey and forwarded to Kiber by Golder. All site materials were delivered under proper chain of custody (COC) via Federal Express Overnight Delivery. Copies of the COC's are included in Appendix A.

Upon receipt, each 2-gallon bucket of untreated material was logged in and placed into refrigerated storage maintained at a temperature of 4 degrees Celsius (°C). Once the untreated materials cooled to a temperature of 4 °C, Kiber homogenized the untreated material from the site. As instructed by Golder, Kiber composited all materials received from the site to develop a single untreated composite sample. Note that the untreated materials were chilled to 4 °C prior to initiating homogenization to minimize the potential for volatilization of organic compounds. The untreated material was composited by combining the contents of each bucket into a large mixing container. The materials were manually blended together with stainless steel hand tools using low energy mixing techniques in an effort to minimize the volatilization of organic compounds that may be present. Homogenization continued for a period of approximately 10 to 15 minutes until visually homogenous. Upon completion, the homogenized material was placed back into the original shipping containers and returned to refrigerated storage.

In an effort to detect the release of volatile organic compounds from the untreated material during homogenization, Kiber monitored for volatile organic compounds using a Photionization Detector (PID). PID values during homogenization ranged from 40 to 50 parts per million (ppm).

During homogenization, any large and agglomerated particles were broken into smaller, more manageable sizes. All particles and debris larger than 0.5 inches in diameter were removed. This process was performed in order to 1) simulate potential full-scale particle size reduction, and 2) ensure that the material was practical for laboratory analysis. Kiber's experience indicates that contaminants are generally concentrated on the fine-grained particles; therefore, laboratory testing on material of less than 0.5 inches in diameter typically presents a worst-case contaminant scenario. The untreated materials contained a small amount of vegetative debris such as roots and sticks. These materials were removed from the untreated material prior to performing treatability testing. Visual observations of the untreated composite indicated a moist dark brown to black tarry material with a strong organic odor.

2.3 BASELINE CHARACTERIZATION

Untreated material characterization is an essential component of the treatability study. The establishment of the baseline level of constituent concentrations is important for comparing and determining the effectiveness of the treatment processes. The characterization analyses also allow confirmation that the materials were similar to those expected at the site. The untreated composite was characterized through comprehensive analytical and geotechnical characterization analyses.

Baseline characterization analyses were performed in triplicate on the untreated composite material. Specifically, the analytical evaluations performed on the untreated composite included:

| | |
|------------------|------------------------|
| Total Volatiles | EPA Method 8260B |
| SPLP Volatiles | EPA Methods 1312/8260B |
| Total Pesticides | EPA Method 8081 |
| SPLP Pesticides | EPA Methods 1312/8081 |
| Total PCBs | EPA Method 8081 |
| SPLP PCBs | EPA Methods 1312/8082 |

| | |
|------------------------|------------------------|
| Total Arsenic and Lead | EPA Methods 6010B |
| SPLP Lead and Arsenic | EPA Methods 1312/6010B |
| Total Chloride | EPA Method 325.2 |
| Material pH | EPA Method 9045C |
| Ignitability | EPA Method 1010 |

The following geotechnical characterization tests were conducted on aliquots of each of the untreated materials in accordance with the referenced test method:

| | |
|------------------|-------------|
| Moisture Content | ASTM D 2216 |
| Bulk Unit Weight | ASTM D 5057 |

The results of baseline characterization analyses are presented in Tables 1 through 5. Tables 1 and 2 present the results of total and SPLP volatile organic analyses. The results of total pesticide and PCB analyses are presented in Table 3. Table 4 presents the results of SPLP pesticide and PCB analyses. The results of all additional analytical and geotechnical testing are included in Table 5. Analytical and geotechnical data reports are included in Appendix B.

Volatile Organic Analyses

Table 1 presents the results of total volatile organic analyses performed on triplicate aliquots of the untreated composite sample. The results indicate that the untreated aliquots contained high concentrations of several volatile organic compounds. Tetrachloroethene, trichloroethene, toluene, o-xylene and m-xylene were found at the highest concentrations. Specifically, tetrachloroethene was detected at a range of 4,900,000 to 7,100,000 micrograms per kilogram (ug/kg), toluene was found at a range of 5,200,000 to 7,500,000 ug/kg, trichloroethene was found at a range of 6,800,000 to 9,500,000 ug/kg, o-xylene was found at a range of 820,000 to 1,200,000 ug/kg and m-xylene was found at a range of 3,100,000 to 4,300,000 ug/kg. Note that the ranges are in reference to the triplicate aliquots of the untreated composite material. Additional compounds detected at concentrations ranging from 740,000 to 1,100,000 ug/kg include ethylbenzene and 1,1,1-trichloroethane. Acetone, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,1-dichloroethane, 4-methyl-2-pentanone, methylene chloride, n-propyl benzene, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were all detected at concentrations ranging from 78,000 to 320,000 ug/kg. Other compounds detected at concentrations of less than 100,000 ug/kg include benzene, 1,2-dichloroethane, cis-1,2-dichloroethene, 1,2-dichloropropane, isopropylbenzene, and naphthalene.

SPLP Volatile Organic Analyses

The results of SPLP volatile organic analyses are presented in Table 2. The untreated composite material exhibited leachable tetrachloroethene concentrations ranging from 14,000 to 16,000 micrograms per liter (ug/L), leachable toluene concentrations ranging from 49,000 to 50,000 ug/L, leachable 1,1,1-trichloroethane concentrations ranging from 13,000 to 14,000 ug/L, leachable trichloroethene concentrations ranging from 84,000 to 89,000 ug/L, and leachable m-xylene concentrations ranging from 10,000 to 11,000 ug/L. Acetone was found at concentrations ranging from 12,000 to 13,000 ug/L, 2-butanone was detected at concentrations ranging from 9,300 to 10,000 ug/L, and 4-methyl-2-pentanone was detected at concentrations ranging from 11,000 to 12,000 ug/L. Compounds detected at concentrations ranging from 880 ug/L to 5,000 ug/L include chlorobenzene, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, cis-1,2-dichloroethene, methylene chloride and o-xylene. Additional volatile organic compounds detected at concentrations of less than 1,000 ug/L include benzene, 1,2-dichlorobenzene, 1,1-dichloroethene, 1,2-dichloropropane, isopropylbenzene, naphthalene, n-propyl benzene, 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and vinyl chloride.

Total Pesticide and PCB Analyses

Table 3 presents the results of total pesticide and PCB analyses performed on the untreated composite material. A review of the results of aliquots A, B and C indicate that Dieldrin was the only pesticide detected in each of the three aliquots. Specifically, Dieldrin was detected in aliquot A at a concentration of 4,700 ug/kg, in aliquot B at a concentration of 9,600 ug/kg and in aliquot C at a concentration of 13,000 ug/kg. All remaining pesticide compounds were not detected in the samples. A review of the total PCB data indicates that Aroclor-1242 was the only PCB compound detected in the untreated composite aliquots. Aroclor-1242 concentrations ranged from 330,000 to 990,000 ug/kg in the untreated composite triplicate analyses.

SPLP Pesticide and PCB Analyses

The results of SPLP pesticide and PCB analyses are presented in Table 4. As seen previously with the total pesticide analyses, Dieldrin was the only pesticide compound found at detectable concentrations. Specifically, Dieldrin was found at leachable concentrations of 60 ug/L, 43 mg/L and 45 mg/L, in aliquots A, B and C, respectively. The SPLP PCB data indicates that Aroclor-1242 was the only aroclor compound detected in the SPLP leachate. Aroclor-1242 was found in aliquots A, B and C at leachable concentrations of 5,000 ug/L, 3,300 ug/L and 4,400 ug/L, respectively.

Additional Chemical and Physical Analyses

Table 5 presents the results of all additional chemical and physical analyses performed on the untreated composite sample. Based on review of the table, total lead was detected at concentrations ranging from 770 to 1,200 milligrams per kilogram (mg/kg), while SPLP lead concentrations ranged from 2.6 to 3.6 milligrams per liter (mg/L). Total arsenic concentrations ranged from 13 to 18 mg/kg, and SPLP arsenic was not detected in the samples. Chloride was found in the untreated composite material at concentrations ranging from 1,200 to 5,700 mg/kg. The untreated composite sample had material pH values ranging from 8.9 to 9.2 standard units (s.u.), flash points ranging from 35 to 39 °C, dry-basis moisture contents ranging from 58 to 62%, a bulk density of 95 pounds per cubic feet (lbs/ft³) and a bulk specific gravity of 1.5. Once baseline characterization of the untreated composite material was complete, Kiber proceeded with Phase II: Screening Tests.

3.0 SCREENING TESTS

3.1 OVERVIEW

The screening phase of the 216 Paterson Plank Road site treatability study was designed to evaluate a variety of reagent designs capable of stabilizing and solidifying the untreated composite material. Prior to developing mixtures, Kiber provided Golder with a proposed mixture development table for review. After review by Golder, Kiber proceeded with Phase II mixture development. Note that mixtures were developed with the addition of pumpable reagent slurries to simulate full-scale in-situ s/s treatment as specified in the Statement of Work. The following sections summarize the protocols used by Kiber and the results of all testing and observations performed during Phase II.

3.2 BLENDING TECHNIQUES AND SAMPLE FORMATION

A total of 12 mixtures were developed during Phase II: Screening Tests. Reagents that were utilized for treatment include Type I Portland cement alone, a combination of cement and organophillic clay, and a combination of cement and hydrated lime.

Each mixture was developed by placing an aliquot of the untreated composite into a blending chamber. The specified percentage of reagent was slurried with the specified percentage of water and added to the untreated material. For mixtures developed with more than one reagent, the reagents were blended dry, slurried with water and added to the untreated composite and blended. The mixture was then blended at a rate of approximately 40 to 60 rotations per minute (rpm) until visually homogenous, a period of 60 to 90 seconds.

For all mixtures, the percent reagent and percent water are based on the initial weight of the untreated aliquot. For example, in a mixture with a 10% addition of cement and 8% addition of water, 20 grams of cement was slurried with 16 grams of water and added to 200 grams of untreated material. Potable tap water was used for all the mixtures since distilled or deionized water is not practical for use in full-scale remediation.

After mixing was complete, the treated materials were transferred to cylindrical molds and allowed to cure for 21 days in a humid environment maintained at a temperature between 18 and 24°C. Treated materials were cured in a humid environment in an effort to represent conditions that will be present during full-scale treatment. Table 6 presents the mixtures developed by Kiber. This table includes Kiber's mixture numbers, reagent type, and reagent and water addition rates.

During the curing process the treated materials were evaluated for setting and strength properties with a pocket penetrometer. Penetrometer analyses are performed with a Brainard-Kilman S-170 pocket penetrometer. The pocket penetrometer is a hand held instrument commonly used during field drilling tests to estimate the unconfined compressive strength of soils. The penetrometer is calibrated by the manufacturer in increments of 0.25 tons per square foot (tons/ft²) with a maximum reading of 4.5 tons/ft² (63 lbs/in²).

3.3 TREATED EVALUATIONS

The results of penetrometer analyses performed on the treated materials, as presented in Table 6, indicate that the mixtures treated with the highest concentrations of cement alone resulted in the highest penetrometer strength values. Specifically, the addition of Type I Portland cement at addition rates of 40 and 50% resulted in penetrometer strength values of 2.0 and 2.5 tons/ft², respectively after 21 days of curing. The mixtures treated with 10% Type I Portland cement, and a combination of 20% Type I Portland cement and 3% organophillic clay resulted in penetrometer strengths of 1.5 tons/ft² after 21 days of curing. All remaining mixtures exhibited penetrometer strengths of 1.0 tons/ft² or less after 21 days of curing.

Based on the results of penetrometer strength testing data, Kiber and Golder selected treated materials for performing unconfined compressive strength testing, after 21 days of curing. Specifically, Kiber and Golder selected a total of eight treatment designs for unconfined compressive strength testing. The treatment designs were selected based on visual observations, penetrometer strengths, cost-effectiveness and Kiber's experience in treating similar materials. The UCS test is a measure of the shear strength of a soil-like material under unsaturated and unconfined conditions. All testing was performed on specimens measuring 2.0 inches in diameter and 4.0 inches in length. Before testing, the weight and dimensions were recorded for each test specimen. Each specimen was tested

at a strain rate of 1 percent per minute. Testing was terminated at failure of the specimen as defined by ASTM D 2166. To clarify, UCS testing was terminated after achieving the maximum unconfined compressive strength or upon attaining 15% strain, whichever occurred first. The treated materials selected for testing are included in Table 7. A review of the results indicates that the mixture that exhibited the highest unconfined compressive strength includes the mixture developed with a combination of 20% cement and 20% hydrated lime. This mixture design achieved a strength of 15 lbs/in² after 21 days of curing. The mixtures developed with 10% Type I Portland cement, 50% Type I Portland cement, and a combination of 20% cement and 3% clay all resulted in unconfined compressive strength values of 14 lbs/in². Physical data reports are included in Appendix C.

Note that the treated materials were developed in an effort to improve the strength and handling characteristics of the untreated composite material. Although a specific unconfined compressive strength criteria was not identified, Kiber developed treated materials in an effort to achieve a strength of approximately 10 to 15 lbs/in². Based on the results of unconfined compressive strength testing, Kiber and Golder identified mixture designs to be evaluated and/or optimized during the next phase of testing.

4.0 PHASE III: INTERMEDIATE TESTS

4.1 OVERVIEW

The Intermediate Testing phase of the 216 Paterson Plank Road site treatability study was performed to 1) evaluate the use of air stripping as a method for pretreatment of the site material, 2) further evaluate and optimize treatment designs evaluated during Phase II, and 3) evaluate the potential benefit of zero-valent iron amendment. Based on the results of Phase II: Screening Tests, Kiber and Golder identified candidate mixtures based on unconfined compressive strength testing results, cost effectiveness and visual observations. During this phase of testing, Kiber evaluated the benefit of iron amendment pretreatment in addition to the candidate mixtures. Specifically, Kiber and Golder identified a total of four mixture designs to be evaluated with and without iron pretreatment for Phase III of the treatability study. The mixture designs that were selected include the following:

- 10% Type I Portland Cement
- 20% Type I Portland Cement / 3% Organophillic Clay
- 20% Type I Portland Cement / 5% Organophillic Clay
- 10% Type I Portland Cement / 10% Hydrated Lime

These mixture designs were evaluated following air stripping evaluations. The following sections include detailed discussions of the procedures utilized and the results of all testing performed during Phase III of the treatability study.

4.2 AIR STRIPPING EVALUATIONS

Air stripping evaluations were performed by Kiber to identify the potential benefit of air stripping in reducing the concentration of total volatile organic compounds prior to s/s treatment. Since the presence of high organic concentrations commonly interferes with the cement hydration reaction, air stripping the untreated composite prior to s/s treatment has been proven to reduce the level of matrix interference by effecting mass removal of volatile organic compounds thus allowing a shorter and more intense cement hydration reaction. Under high organic conditions, cement hydration reactions are generally less

effective and slower to occur. Kiber performed air stripping treatment in a glove bag to assist in quantifying the volatile organic compounds expelled during air stripping treatment.

4.2.1 Glove bag and Air Stripping Setup and Performance

Air stripping treatment was performed inside of a glove bag, which is a sealed, air-tight chamber. Once all necessary equipment is placed into the glove bag, it is sealed from the outside environment. Necessary equipment includes all materials needed to perform air stripping treatment as well as monitoring equipment. After the glove bag was sealed, the PID meter was turned on and used for real-time evaluation of the conditions inside the glove bag chamber. Monitoring of organic emissions was performed throughout air stripping treatment.

Testing was performed by connecting one end of the glove bag chamber to a breathing-quality air supply. The air supply was then used to purge the chamber air prior to initiation of the air stripping procedure. Air was continuously flushed from the sealed glove bag until constituent levels inside the glove bag, as measured by the PID meter, were reduced to levels lower than laboratory background. The glove bag was purged for a period of 15 to 20 minutes prior to initiation of air stripping treatment.

After purging the chamber, the other end of the glove bag was connected to a series of three carbon cartridges and an air pump running at 3 liters per minute (lpm). The carbon cartridges utilized during the volatilization study were 6 millimeters (mm) in diameter and 70 mm in length, 150 milligram (mg) coconut based charcoal cartridges. In order to reduce the likelihood of laboratory contamination entering the glove bag, and therefore being trapped on the carbon cartridges, the inflow to the glove bag was kept higher than the outflow. As such, a slight positive pressure was maintained within the glove bag based on a breathing air inflow rate of 3 lpm, an air stripping inflow rate of 5 lpm and an outflow rate of 3 lpm. The air supply was used to flush any volatile organic compounds from the chamber and onto the carbon cartridges. Once the carbon cartridges were attached to the pumps, air stripping treatment began in accordance with the following protocols.

Air stripping was performed using a bench-scale Hobart style mixer modified with air injection ports. Treatment was performed by placing a 1,500 gram aliquot of untreated composite material into the air-port injection chamber. The material was then blended at a rate of approximately 60 to 90 rpm while air was injected at a rate of 5 lpm through the

material to promote volatilization of constituents. These revolution rates are typical to those used during full-scale treatment. Air injection treatment was performed for a total of 120 minutes. Air was supplied by a compressor that supplies breathing-quality air.

The carbon cartridges were attached to the glove bag as soon as air stripping treatment was initiated. PID readings were recorded approximately every minute for the first 20 minutes and approximately every 5 to 10 minutes thereafter for 120 minutes. Upon reaching 120 minutes, Kiber removed the carbon cartridges and submitted them for total volatile organic analyses in accordance with EPA method 8260B.

A graph presenting PID and values over time is presented in Table 8. Also presented in Table 8 is Kiber's mixture number, material type, glove bag setup information and maximum PID value recorded during air stripping treatment. A review of the graph presenting PID values recorded during air stripping indicate that the highest PID values were observed during the first 10 minutes of air stripping. A maximum PID value of 1,566 ppm was observed after 3 minutes of air stripping. PID values continued to drop throughout the next 120 minutes. Note that there was a slight increase in PID values from 29 through 60 minutes. After reaching 60 minutes of air stripping, PID values continued to diminish to a final PID value of 69 ppm after 120 minutes of air stripping.

4.2.2 Glove bag and Air Stripping Treated Evaluations

During air stripping treatment aliquots of the air stripped material were removed from the injection chamber at intervals of 10 minutes, 30 minutes, 60 minutes and 120 minutes. Note that a sample of the untreated composite aliquot was also sampled at time zero for a baseline concentration. Each aliquot was subjected to total volatile organic analyses in accordance with EPA Method 8260B. The carbon cartridges that were connected to the glove bag during air stripping treatment were also subjected to total volatile organic analyses after 120 minutes of air stripping. The results of air stripping evaluations are included in Tables 9 and 10. Analytical data reports are included in Appendix D.

The results of total volatile organic analyses performed on the air stripped soil, as presented in Table 9, indicate significant reductions in total volatile organic concentrations as a result of air stripping treatment. Specifically, trichloroethene which was present in the time zero sample at 8,000,000 ug/kg, was reduced to 260,000 ug/kg after 120 minutes of air stripping. Tetrachloroethane and toluene were reduced from 5,800,000 and 5,900,000 ug/kg to 610,000 and 370,000 ug/kg, respectively after air stripping treatment. m-Xylene was reduced from an initial concentration of 3,000,000 ug/kg to 620,000 ug/kg, and o-

xylene was reduced from 800,000 ug/kg to 190,000 ug/kg. In summary, air stripping treatment was capable of reducing the concentrations of all detected compounds after 120 minutes of air stripping treatment.

Table 10 presents the results of total volatile organic analyses performed on the carbon cartridges. In order to identify the location of the carbon cartridges in series, each cartridge was designated a letter label. Carbon A represents the carbon closest to the outside air, or furthest away from the glove bag. Carbon C is the carbon closest to the glove bag, or furthest from the outside air. The results of total volatile organic analyses performed on the carbon cartridges indicate very high concentrations of organic compounds. Additionally, as expected, Carbon C (carbon closest to the glove bag) exhibited the highest volatile organic concentrations followed by Carbon B and Carbon A.

A review of the results indicates that tetrachloroethene was detected at a concentration of 40,000,000 ug/kg in Carbon C, 29,000,000 ug/kg in Carbon B and 27,000,000 ug/kg in Carbon A. Toluene concentrations for Carbons A, B and C were 18,000,000 ug/kg, 19,000,000 ug/kg and 27,000,000 ug/kg, respectively, and m-xylene concentrations were found at concentrations of 39,000,000 ug/kg, 43,000,000 ug/kg and 65,000,000 ug/kg, respectively. Carbon A, B and C resulted in o-xylene concentrations of 13,000,000 ug/kg, 15,000,000 ug/kg and 21,000,000 ug/kg, respectively, and 1,2,4-trimethylbenzene concentrations of 6,300,000 ug/kg, 8,400,000 ug/kg and 2,800,000 ug/kg, respectively. Ethylbenzene was detected in Carbon A at a concentration of 7,300,000 ug/kg, in Carbon B at a concentration of 7,300,000 ug/kg and in Carbon C at a concentration of 12,000,000 ug/kg. 1,3,5-Trimethylbenzene, 4-methyl-2-pentanone and n-propyl benzene were found at concentrations ranging from 1,500,000 ug/kg to 3,300,000 in each of the carbon cartridges. Other compounds detected in the carbon cartridges include 1,1,1-trichloroethane, p-isopropyltoluene, isopropyl benzene, s-butyl benzene, chlorobenzene and 1,2-dichlorobenzene.

4.3 ZERO-VALENT IRON AMENDMENT

Upon completion of glove bag evaluations, Kiber and Golder identified additional mixture designs to be evaluated. Mixture designs were selected based on performance during previous phases of testing and cost effectiveness. Mixture designs were evaluated with and without zero-valent iron addition to identify the effectiveness of iron in reducing organic contaminant concentrations. Note that prior to performing mixture development,

the untreated composite was reanalyzed to identify the concentrations of organic compounds present. The untreated composite material evaluated during this phase of testing was identified as "parent material". The following sections included detailed discussions of the procedures followed for analysis of the parent material and mixture development.

4.3.1 Parent Material Characterization

During this phase of testing, Kiber and Golder identified a total of four mixture designs to be evaluated with and without zero-valent iron addition, for a total of eight mixtures. Prior to performing mixture development, and as previously mentioned, Kiber sampled an aliquot of parent material in a sufficient quantity to complete the eight outlined mixtures. Once the parent material had been sampled, Kiber split the sample into four aliquots. Each of the four aliquots of parent material represented the material to be used for each of the four treatment designs with and without zero-valent iron. The parent materials and the mixtures that they represent are as follows:

| | |
|-------------------|----------------------|
| Parent Material A | Mixtures 013 and 017 |
| Parent Material B | Mixtures 014 and 018 |
| Parent Material C | Mixtures 015 and 019 |
| Parent Material D | Mixtures 016 and 020 |

The two mixtures identified for each of the four parent material aliquots includes the same treatment design with and without iron addition. Four parent materials were segregated in this manner to identify the concentrations of contaminants present for each individual treatment design, and to minimize the potential impact of the heterogeneity of the parent material.

Once the parent material had been separated into four aliquots, Kiber subjected each of the four aliquots to analytical characterization analyses. The characterization analyses performed on each of the four aliquots are as follows:

| | |
|-----------------|------------------------|
| Total Volatiles | EPA Method 8260B |
| SPLP Volatiles | EPA Methods 1312/8260B |
| Total PCBs | EPA Method 8081 |
| SPLP PCBs | EPA Methods 1312/8082 |
| Total Chloride | EPA Method 325.2 |

The results of parent material characterization analyses are included in Tables 11 through 14. Tables 11 and 12 include the results of total and SPLP volatile organic analyses, while Tables 13 and 14 include the results of total and SPLP PCB analyses. Total chloride results are also included on Table 13. Analytical data reports are included in Appendix D.

Volatile Organic Analyses

The results of total volatile organic analyses, as presented in Table 11, indicate that Parent Materials B, C and D exhibited similar volatile organic concentrations. Parent Material A generally exhibited slightly lower concentrations of the volatile organic compounds previously detected at the highest concentrations in the untreated composite. The compounds found at the highest concentrations in the parent materials include tetrachloroethene, toluene, trichloroethene and m-xylene. These compounds were detected in Parent Materials B, C and D at concentrations ranging from 1,300,000 to 1,600,000 ug/kg, 1,300,000 to 1,800,000 ug/kg and 870,000 to 1,200,000 ug/kg, respectively. Tetrachloroethene, toluene and m-xylene were detected in Parent material A at concentrations of 700,000 ug/kg, 750,000 ug/kg and 500,000 ug/kg, respectively. 1,1,1-Trichloroethane was found at concentrations ranging from 130,000 to 310,000 ug/kg, and ethylbenzene was found at concentrations ranging from 210,000 to 280,000 ug/kg in the parent materials. o-Xylene was detected in the parent materials at concentrations ranging from 220,000 to 320,000 ug/kg, while 1,2,4-trimethylbenzene was detected at concentrations ranging from 99,000 to 130,000 ug/kg. Several other compounds were detected in the parent materials at concentrations of less than 200,000 ug/kg.

SPLP Volatile Organic Analyses

Table 12 presents the results of SPLP volatile organic analyses performed on the parent materials. The results indicate that as seen previously, tetrachloroethene, toluene, trichloroethene and m-xylene were found at the highest concentrations. Specifically, tetrachloroethene was found at concentrations ranging from 11,000 to 13,000 ug/L, toluene was found at concentrations ranging from 41,000 to 48,000 ug/L, trichloroethene was found at concentrations ranging from 62,000 to 78,000 ug/L and m-xylene was found at concentrations ranging from 9,000 to 9,800 ug/L. 4-Methyl-2-pentanone was found at concentrations ranging from 5,200 to 7,100 ug/L, and acetone was found at concentrations ranging from 4,200 to 5,900 ug/L. Volatile organic compounds found at leachable concentrations ranging from 1,400 to 3,900 ug/L include 2-butanone, chlorobenzene, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, ethylbenzene, methylene chloride and o-xylene. Additional volatile organic compounds found at SPLP

concentrations of less than 910 ug/L include benzene, 1,2-dichlorobenzene, 1,1-dichloroethene, cis-1,2-dichloroethene, 1,2-dichloropropane, isopropyl benzene, naphthalene, n-propyl benzene, 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and vinyl chloride. All remaining volatile organic compounds were not detected in the samples.

Total PCBs and Chloride

The results of total PCB and chloride analyses are presented in Table 13. A review of the results indicates that Aroclor-1242 was the only compound detected in each of the four parent materials. Aroclor-1242 was detected in Parent Material A at a concentration of 430,000 ug/kg, in Parent Material B at a concentration of 410,000 ug/kg, in Parent Material C at a concentration of 500,000 ug/kg and in Parent Material D at a concentration of 340,000 ug/kg. Chloride was found in the parent materials at concentrations ranging from 14,000 to 40,000 ug/kg. Parent Material A had a chloride concentration of 40,000 mg/kg, Parent Material B had a chloride concentration of 25,000 mg/kg, Parent Material C had a chloride concentration of 29,000 mg/kg and Parent Material D had a chloride concentration of 14,000 mg/kg.

SPLP PCBs

The results of SPLP PCB analyses, as presented in Table 14, indicate that Aroclor-1242 was the only compound found at detectable concentrations. Parent Material B had the highest Aroclor-1242 concentration of 190 ug/L, while Parent Material A had the lowest Aroclor-1242 concentration of 98 ug/L. Parent Materials C and D had Aroclor-1242 concentrations of 100 and 140 ug/L, respectively.

Review of the results of parent material characterization indicates that the volatile organic and PCB concentrations are lower than those observed during Phase I: Baseline characterization. The apparent decrease in contaminant concentrations is most likely attributed to sample variability. Although Kiber performed homogenization of the original untreated composite material, it is nearly impossible to obtain a sample where variability does not exist. This is especially true when materials that are being testing contain very high concentrations of contaminants and the material has an agglomerated consistency.

4.3.2 Zero-Valent Iron Amendment

Once Kiber had removed samples from each of the four parent materials for analytical characterization testing, Kiber proceeded with Zero-valent iron amendment mixture development on the untreated materials. As previously mentioned, Kiber developed a

total of four mixtures with and without iron addition for a total of eight mixtures during this phase of testing. Mixtures were selected for this round of treatment based on treatment and cost effectiveness during previous phases of the study. The mixture designs that were evaluated are as follows:

- 10% Type I Portland Cement
- 20% Type I Portland Cement / 3% Organophillic Clay
- 20% Type I Portland Cement / 5% Organophillic Clay
- 10% Type I Portland Cement / 10% Hydrated Lime

Note that these four mixture designs were evaluated without iron addition (Mixtures 013 through 016) and with iron addition (Mixtures 017 through 020). The mixtures developed by Kiber are presented in Table 15. This table presents Kiber's sample number, material type, reagent type, and reagent and water addition rates.

Mixture development was performed by placing a pre-weighed aliquot of the specified parent material into a blending chamber. At this time, for the iron amended mixtures, iron was added at a 10.5% addition rate by weight and mixed until homogenous, a time of approximately 60 to 90 seconds. For the mixtures that did not receive iron amendment, the parent material for these mixtures was still mixed in a similar manner to those that did receive iron addition. This was performed to ensure that any volatilization that occurred solely due to mixing was duplicated in both treatment designs. Otherwise a reduction in volatile organic compounds in the materials that received iron amendment, may be due to either iron amendment or mixing. Once the iron had been added and all the materials blended, the mixtures were allowed to cure for a period of 3 days, at which time each was subjected to s/s treatment.

Stabilization mixtures were developed in direct accordance with the mixtures developed during Phase II. After mixture development, the treated materials were compacted into cylindrical molds and allowed to cure for a period of 21 days in a humid environment. Upon reaching 21 days of curing, each was subjected to treated evaluations.

4.3.3 Treated Evaluations

Upon reaching 21 days of curing, each of the eight treated materials were sampled and subjected to treated evaluations. Specifically, the treated materials were subjected to the following treated evaluations in accordance with the referenced test methods:

| | |
|---------------------------------|------------------------|
| Total Volatiles | EPA Method 8260B |
| SPLP Volatiles | EPA Methods 1312/8260B |
| Total PCBs | EPA Method 8081 |
| SPLP PCBs | EPA Methods 1312/8082 |
| Total Chloride | EPA Method 325.2 |
| Unconfined Compressive Strength | ASTM D 2166 |

The results of all analytical and physical analyses are presented in Tables 16 through 20. Tables 16 and 17 include the results of total and SPLP volatile organic analyses, and Tables 18 and 19 include the results of total and SPLP PCB analyses. Total chloride results are also presented on Table 18. The results of unconfined compressive strength testing are included in Table 20. Data reports are presented in Appendix D.

Volatile Organic Analyses

The results of volatile organic analyses as presented in Table 16 indicate that all treated materials resulted in relatively similar volatile organic concentrations. Slightly lower total volatile organic concentrations are indicated for the mixtures developed with iron amendment. Note, however, that the slight apparent reduction is most likely due to dilution since both mixture types were mixed in a similar manner to account for volatilization that may occur as a result of just mixing. Tetrachloroethene concentrations ranged from 1,400,000 ug/kg to 2,200,000 ug/kg, and toluene concentrations ranged from 1,100,000 to 1,800,000 ug/kg. Trichloroethene was detected at concentrations ranging from 790,000 to 1,900,000 ug/kg, and m-xylene concentrations ranged from 1,100,000 to 1,600,000 ug/kg. Ethylbenzene and o-xylene were found at concentrations ranging from 240,000 to 350,000 ug/kg. Compounds detected at concentrations ranging from 27,000 to 220,000 ug/kg include chlorobenzene, 1,2-dichlorobenzene, 4-methyl-2-pentanone, naphthalene, n-propyl benzene, 1,1,1-trichloroethane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. Other compounds detected in the treated materials at concentrations of less than 20,000 ug/kg include p-isopropyltoluene, isopropyl benzene, 1,2-

dichloropropane, cis-1,2-dichloroethene, 1,1-dichloroethene, 1,2-dichloroethane, 1,1-dichloroethane, 1,4-dichlorobenzene, chloroform, s-butylbenzene, n-butylbenzene, 2-butanone, benzene and acetone. All remaining compounds were not detected in the samples.

SPLP Volatile Organic Analyses

Table 17 presents the results of SPLP volatile organic analyses performed on the Phase III treated materials. A review of the results indicates that tetrachloroethene was detected at concentrations ranging from 7,800 to 11,000 ug/L, toluene was found at concentrations ranging from 14,000 to 29,000 ug/L, trichloroethene was found at concentrations ranging from 11,000 to 35,000 ug/L and m-xylene was found at concentrations ranging from 7,900 to 9,000 ug/L. Ethylbenzene, o-xylene, 1,1,1-trichloroethane, 4-methyl-2-pentanone were found at concentrations ranging from 800 to 4,000 ug/L. Several other volatile organic compounds were found at leachable concentrations of less than 1,000 ug/L.

Total PCB and Chloride Analyses

The results of total PCB and chloride analyses are presented in Table 18. The only aroclor detected in each of the treated materials includes Aroclor-1242. Aroclor-1242 was found at concentrations ranging from as low as 350,000 ug/kg to as high as 560,000 ug/kg. Chloride was detected in each of the eight treated materials at concentrations ranging from 3,400 to 7,100 mg/kg.

SPLP PCB Analyses

The results of SPLP PCB analyses, as presented in Table 19, indicate that Aroclor-1242 concentrations ranged from 0.97 to 19 ug/L. All remaining aroclors were not detected in the samples. Note that as seen with previous analyses on the treated materials, the mixture developed with iron amendment resulted in generally lower leachable PCB concentrations. Although a potential correlation, Kiber believes that the reduction is most likely due to dilution through iron addition.

Unconfined Compressive Strength Testing

The results of unconfined compressive strength testing are included in Table 20. A review of the results indicates that all materials achieved strengths of at least 23 lbs/in² after 21 days of curing. The treated materials subjected to iron amendment resulted in slightly higher strengths than those that did not receive iron addition. However, the difference in strength values may also be associated with other variables such as 1) material

heterogeneity and 2) water addition or moisture content. The mixture that achieved the highest strength (49%) included the mixture developed with a combination of 20% cement and 3% organophillic clay. All remaining treated materials exhibited strengths ranging from 27 lbs/in² to 39 lbs/in².

The results of analytical and physical evaluation of the treated materials from Phase III indicate that all mixture designs are capable of reducing the concentrations of leachable volatile organic compounds and PCBs. Additionally, all mixture designs were capable of producing sufficient strength in the final treated materials after 21 days of curing. Although iron amendment resulted in apparent decreases in both volatile organic and PCB concentrations, Kiber believes that the reductions are due primarily to dilution rather than treatment. Based on the analytical and physical results of the treated materials, Kiber and Golder selected two mixture designs with and without iron addition for further evaluation during Phase IV of the treatability study.

5.0 VERIFICATION TESTING

5.1 INTRODUCTION

Verification testing was designed to evaluate the optimum mixtures identified during Phase III of the treatability study after air stripping pretreatment. This phase of testing was performed in a similar manner to Phase III. Initially, Kiber sampled a large aliquot of parent material in a sufficient quantity to perform all mixture development. The parent materials were analyzed to develop a baseline concentration for the untreated materials to be utilized for mixture development. Once the samples were removed for baseline characterization analyses, the material was air stripped. Air stripping was followed by iron amendment and three days of curing. Upon reaching three days of curing the treated materials were again sampled and subjected to analytical characterization testing. Once the aliquots were removed, Kiber proceeded with stabilization treatment of each of the four aliquots. Upon reaching the target cure date, the treated materials were subjected to comprehensive analytical and physical characterization testing. The treatment designs that were evaluated throughout Phase IV with and without iron addition are as follows:

- 10% Type I Portland Cement
- 10% Type I Portland Cement / 10% Lime

The following sections include a discussion of the results of parent material characterization analyses followed by treatment and treated material characterization. These sections also include detailed descriptions of the protocols followed for all testing performed during Phase IV.

5.2 PARENT MATERIAL CHARACTERIZATION

Parent material characterization was performed in accordance with the protocols followed during Phase III. Kiber sampled a large aliquot of untreated composite material for mixture development during Phase IV. Note that for Phase IV testing, Kiber opened a bucket that had been sealed since the beginning of the treatability study in the event that the previously opened buckets had been subject to volatilization. Once the aliquot was removed, Kiber proceeded to slightly homogenize the sample to ensure a homogenous material for testing. After homogenization, Kiber separated the aliquot into two separate

aliquots and labeled them as Parent Material A and Parent Material B. Each of the two parent materials would be used to develop a total of two mixtures. The mixtures developed with the specified parent materials are as follows:

| | |
|-------------------|----------------------|
| Parent Material A | Mixtures 021 and 023 |
| Parent Material B | Mixtures 022 and 024 |

Note that the mixtures developed with each parent material represent the same treatment design, however, one mixture includes iron amendment and the other does not. Once the parent materials were designated, Kiber proceeded to sample each aliquot for parent material characterization analyses. Each of the parent materials was sampled and subjected to the following analytical analyses in accordance with the referenced test methods:

| | |
|------------------|-----------------------------|
| Total Volatiles | EPA Method 8260B |
| SPLP Volatiles | EPA Methods 1312/8260B |
| Total Pesticides | EPA Method 8081 |
| SPLP Pesticides | EPA Methods 1312/8081 |
| Total PCBs | EPA Method 8081 |
| SPLP PCBs | EPA Methods 1312/8082 |
| Total TAL Metals | EPA Methods 6010B/7471 |
| SPLP TAL Metals | EPA Methods 1312/6010B/7470 |
| Total Chloride | EPA Method 325.2 |

The results of parent material characterization analyses are presented in Tables 21 through 26. Total and SPLP volatile organic analyses are presented in Tables 21 and 22, and total and SPLP pesticide and PCB analyses are presented in Tables 23 and 24. The results of total and SPLP TAL metals analyses are presented in Tables 25 and 26, and total chloride results are presented in Table 25. Analytical data reports are included in Appendix E.

Total Volatile Organic Analyses

Table 21 presents the results of total volatiles organic analyses performed on the Phase IV parent materials. The results indicate that the parent materials had very similar concentrations to those observed during Phase I: Baseline Characterization. Specifically, tetrachloroethene was detected at concentrations of 5,200,000 ug/kg and 6,300,000 ug/kg, while toluene was detected at concentrations of 5,200,000 ug/kg and 6,800,000 ug/kg. Trichloroethene exhibited concentrations of 6,900,000 and 9,100,000 ug/kg, and

m-xylene exhibited concentrations of 2,400,000 and 4,000,000 ug/kg. The parent materials exhibited 1,1,1-trichloroethane concentrations of 830,000 and 1,400,000 ug/kg. Ethylbenzene, 1,2,4-trimethylbenzene and o-xylene were detected at concentrations ranging from 270,000 to 1,000,000 ug/kg. Several other volatile organic compounds were also found at detectable concentrations lower than 200,000 ug/kg.

SPLP Volatile Organic Analyses

The results of SPLP volatile organic analyses, as presented in Table 22, indicate that trichloroethene was detected at the highest leachable concentrations of 87,000 and 130,000 ug/L. Toluene was detected at concentrations of 49,000 and 79,000 ug/L, while m-xylene was detected at concentrations of 11,000 and 35,000 ug/L. Tetrachloroethene was also detected at very high concentrations of 15,000 and 55,000 ug/L. o-Xylene, 1,1,1-trichloroethane, 4-methyl-2-pentanone, ethylbenzene, 1,2-dichloroethane, 1,1-dichloroethane, chloroform, chlorobenzene, methylene chloride, 2-butanone and acetone were detected at concentrations ranging from 1,600 to 21,000 ug/L. Other compounds found at detectable concentrations of less than 2,400 ug/L include benzene, bromomethane, 1,2-dichlorobenzene, cis-1,2-dichloroethane, 1,2-dichloropropane, isopropyl benzene, naphthalene, n-propyl benzene, 1,2,3-trichlorobenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. All remaining compounds were not detected in the samples.

Total Pesticide and PCB Analyses

The results of total pesticide and PCB analyses are presented in Table 23. A review of the pesticide results indicates that both parent materials exhibited non-detectable concentrations for all pesticide compounds. The results of total PCB analyses indicate that Aroclor-1242 was the only aroclor detected at concentrations of 580,000 and 600,000 ug/kg. All remaining aroclors were not detected in the samples.

SPLP Pesticide and PCB Analyses

Table 24 presents the results of SPLP pesticide and PCB analyses. The results indicate that both parent materials exhibited non-detectable concentrations of all pesticide compounds. The results of SPLP PCB analyses indicate that Aroclor-1242 was detected in each of the parent materials at concentrations of 58 and 51 ug/L. All remaining aroclor compounds were not detected in the samples.

Total TAL Metals and Chloride Analyses

The results of TAL metals analyses, as presented in Table 25, indicate that the metals found at the parent materials at the highest concentrations were aluminum, calcium, iron and sodium. These metals were found at concentrations ranging from 12,000 to 46,000 mg/kg. Lead was found at concentrations of 810 and 750 mg/kg, while arsenic was found at concentrations of 12 and 11 mg/kg. Additional metals found at concentrations ranging from 1,100 to 5,300 mg/kg include copper, magnesium, potassium and zinc. All remaining metals were detected at concentrations of less than 810 mg/kg. Chloride was detected in each of the two parent materials at concentrations of 9,400 and 10,000 mg/kg.

SPLP TAL Metals Analyses

The results of SPLP TAL metals analyses are presented in Table 26. A review of the results indicates that the parent materials exhibited a leachable sodium concentration of 480 mg/L, leachable iron concentrations 13 and 26 mg/L, leachable calcium concentrations of 31 and 50 mg/L and leachable aluminum concentrations of 8.4 and 27 mg/L. Lead was detected at a leachable concentration of 0.94 and 1.6 mg/L, while arsenic was detected at leachable concentrations of 0.027 and 0.055 mg/L. Copper, magnesium, potassium and zinc were detected at concentrations ranging from 2.9 to 10 mg/L. All remaining metals were found at concentrations less than 1 mg/L.

The results of parent material characterization testing performed during Phase IV of the study indicates that the materials are similar to those evaluated during Phase I: Baseline Characterization. Once Kiber had confirmed that the parent materials were representative of the untreated composite material, Kiber proceeded with air stripping of the parent materials.

5.3 AIR STRIPPING / IRON AMENDMENT

Air stripping was performed as pretreatment in an effort to reduce volatile organic concentrations prior to addition of the stabilization reagents. Air stripping pretreatment had been successful in previous phases of the treatability study at reducing volatile organic concentrations and improving the physical characteristics of the untreated composite. As a result, air stripping pretreatment was carried forward to Phase IV testing.

Air stripping was performed in accordance with previously discussed protocols on the parent materials. Prior to performing air stripping treatment, Kiber separated each of the two parent materials into two equal aliquots, for a total of four separate aliquots of material. Once two aliquots of Parent material A and two aliquots of Parent Material B existed, Kiber performed air stripping separately on each of the aliquots of untreated material. Specifically, the aliquots were air stripped for a period of 120 minutes using a flow rate of 5 lpm. The four aliquots of untreated material were then given mixture numbers. The following mixtures were developed using the corresponding parent materials during this phase of testing

| <u>Mixture No.</u> | <u>Amended</u> | <u>Material</u> | <u>Reagent Type and Addition</u> |
|--------------------|----------------|-----------------|---------------------------------------|
| 2964-021 | No Iron | Parent A | 10% Type I Portland Cement |
| 2964-022 | No Iron | Parent B | 10% Type I Portland Cement / 10% Lime |
| 2964-023 | Iron | Parent A | 10% Type I Portland Cement |
| 2964-024 | Iron | Parent B | 10% Type I Portland Cement / 10% Lime |

Table 27 includes the mixtures developed during this phase of testing. This table includes Kiber's sample numbers, material type, reagent type, and reagent and water addition rates. Once air stripping was complete, Kiber performed iron amendment on the Parent B materials. Parent Material A was mixed in a manner similar to the mixing that occurred in Parent Material B during iron amendment in an effort to mimic potential volatilization of organics that may have occurred solely due to mixing. Note that iron was added at a 10.5% addition rate by weight, as was performed during Phase III of the treatability study. Once each of the materials had been mixed sufficiently to produce a homogenous material, Kiber allowed the parent materials to sit for a period of 3 days. Upon reaching 3 days, each mixture was sampled and subjected to characterization analyses. Characterization analyses were performed at this time to identify the effect of air stripping and iron amendment on the untreated composite material. The following analytical characterization testing was performed on each of the four mixtures in accordance with the specified test methods:

| | |
|-----------------|------------------|
| Total Volatiles | EPA Method 8260B |
| Total PCBs | EPA Method 8081 |
| Total Chloride | EPA Method 325.2 |

The results of characterization testing performed on the mixtures after air stripping and iron amendment are included in Tables 28 and 29. Table 28 includes the results of total volatile organic analyses, and Table 29 includes the results of total PCB and chloride analyses. Analytical data reports are included in Appendix E.

Total Volatile Organic Analyses

The results of total volatile organic analyses, as presented in Table 28, indicate that the mixtures exhibited similar volatile organic concentrations to those exhibited by the materials previously air stripped during Phase III. Tetrachloroethene was detected at concentrations ranging from 430,000 to 980,000 ug/kg, toluene was detected at concentrations ranging from 220,000 to 620,000 ug/kg, trichloroethene was detected at concentrations ranging from 150,000 to 510,000 ug/kg, m-xylene concentrations ranging from 430,000 to 850,000 ug/kg, and o-xylene concentrations ranging from 140,000 to 270,000 ug/kg. Additional compounds detected at concentrations ranging from 33,000 to 190,000 ug/kg include 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, naphthalene, ethylbenzene and 1,2-dichlorobenzene. Chlorobenzene, 2-butanone, isopropyl benzene, n-propyl benzene and 1,1,1-trichloroethane were found at concentrations ranging from 5,600 to 49,000 ug/L.

Total PCB and Chloride Analyses

Table 29 presents the results of total PCB and chloride analyses. The results of total PCB analyses indicate that the mixtures exhibited Aroclor-1242 concentrations ranging from 690,000 to 1,700,000 ug/kg. To clarify, mixture 021 exhibited an Aroclor-1242 concentration of 690,000 ug/kg, while the remaining three mixtures exhibited Aroclor-1242 concentrations ranging from 1,200,000 to 1,700,000 ug/kg. Total chloride concentrations were found in the range of 5,800 to 7,700 mg/kg.

The previously discussed results do not indicate any correlations as to the benefit of iron addition. However, the results of air stripping were similar to those obtained during Phase III and thus indicate a significant decrease in volatile organic concentrations as a result.

5.4 STABILIZATION / SOLIDIFICATION TREATMENT

Once the mixtures had been allowed to sit for 3 days after air stripping and iron amendment, Kiber proceeded with s/s reagent addition. As previously outlined, the mixtures developed by Kiber are presented in Table 27. The mixtures were developed on each of the corresponding parent materials in accordance with previously discussed protocols. Immediately following mixture development, the treated materials were compacted into cylindrical molds for curing. The materials were allowed to cure for a period of 28 days in a humid environment. Once curing was complete, Kiber subjected each of the four mixtures to comprehensive analytical and physical characterization analyses. Specifically, the characterization analyses performed on each of the four treated materials were as follows:

| | |
|---------------------------------|-----------------------------|
| Total Volatiles | EPA Method 8260B |
| SPLP Volatiles | EPA Methods 1312/8260B |
| Total Pesticides | EPA Method 8081 |
| SPLP Pesticides | EPA Methods 1312/8081 |
| Total PCBs | EPA Method 8081 |
| SPLP PCBs | EPA Methods 1312/8082 |
| Total TAL Metals | EPA Methods 6010B/7471 |
| SPLP TAL Metals | EPA Methods 1312/6010B/7470 |
| Total Chloride | EPA Method 325.2 |
| Ignitability | EPA Method 1010 |
| Unconfined Compressive Strength | ASTM D 2166 |
| Bulk Density | ASTM D 5057 |
| Moisture Content | ASTM D 2216 |
| Volumetric Increase | NA |

The results of comprehensive characterization analyses are included in Tables 30 through 36. Total volatile organic and SPLP volatile organic analyses are presented in Tables 30 and 31, respectively. Total pesticide, PCB, chloride and flash point results are presented in Table 32. Table 33 presents the results of SPLP PCB and pesticide results. Total TAL metals results are presented in Table 34, and SPLP TAL metals results are presented in Table 35. The results of unconfined compressive strength testing are included in Table 36. Analytical and physical data reports are included in Appendix E.

Volatile Organic Analyses

The results of total volatile organic analyses, as presented in Table 30, indicate that the treated materials exhibited significantly lower concentrations than those observed from previous phases of the treatability study. The compounds found at the highest concentrations include tetrachloroethane, toluene, trichloroethene and m-xylene. Tetrachloroethene and m-xylene were found at concentrations ranging from 120,000 to 330,000 ug/kg. o-Xylene, 1,2,4-trimethylbenzene, naphthalene, ethylbenzene, and 1,2-dichlorobenzene were found at concentrations ranging from 32,000 to 190,000 ug/kg. Additional compounds found at concentrations ranging from 3,000 to 27,000 mg/kg include 1,3,5-trimethylbenzene, isopropyl benzene, n-propyl benzene, chlorobenzene and n-butyl benzene. Trichloroethene was detected at concentrations of 17,000 ug/kg, 140,000 ug/kg, 36,000 ug/kg and 41,000 ug/kg. Several other compounds were detected in the treated materials at lower concentrations.

SPLP Volatile Organic Analyses

Table 31 presents the results of SPLP volatile organic analyses performed on the treated materials. A review of the results indicates that the treated materials exhibited tetrachloroethene concentrations ranging from 670 to 2,200 ug/L, toluene concentrations ranging from 630 to 4,100 ug/L, trichloroethene concentrations ranging from 120 to 2,600 ug/L, and m-xylene concentrations ranging from 1,300 to 4,800 ug/L. Ethylbenzene and o-xylene were detected at concentrations ranging from 490 to 2,100 ug/L. Other compounds detected at leachable concentrations ranging from 160 to 870 ug/L include 1,2,4-trimethylbenzene, naphthalene, 1,2-dichlorobenzene and acetone. Several other volatile organic compounds were found at low detectable concentrations in the treated materials.

Total PCBs, Pesticides, Chloride and Ignitability

Table 32 presents the results of total PCB, pesticide, chloride and ignitability analyses performed on the treated materials. A review of the results of total PCB analyses indicates that the treated materials exhibited Aroclor-1242 concentrations ranging from 290,000 to 450,000 ug/kg. All remaining PCB and pesticide compounds were not detected in the samples. Total chloride results for the treated materials ranged from 3,000 to 5,800 mg/kg. The results of ignitability indicated that all treated materials had flash points in excess of 95 °C.

SPLP PCB and Pesticide Analyses

The results of SPLP pesticide and PCB analyses are presented in Table 33. A review of the data reveals that as seen previously with total analyses, all pesticide compounds were not detected in the samples. The only aroclor detected included Aroclor-1242. Aroclor-1242 was detected at concentrations ranging from 0.52 to 2.0 ug/L. All remaining aroclors were found below detectable limits.

Total TAL Metals Analyses

The results of total TAL metals analyses are presented in Table 34. Calcium exhibited the highest concentrations ranging from 69,000 to 120,000 mg/kg, and iron exhibited concentrations ranging from 19,000 to 130,000. Note that the mixtures developed with iron exhibited much higher concentrations of iron than those developed without iron. Additionally, the mixtures developed with hydrated lime exhibited much higher calcium concentrations than those developed with only cement. Aluminum and sodium concentrations ranged from 9,000 to 15,000 mg/kg, while zinc, copper and potassium concentrations ranged from 900 to 5,830 mg/kg. Lead was detected in the treated materials at concentrations ranging from 590 to 1,100 mg/kg, while arsenic was detected at concentrations ranging from 13 to 35 mg/kg. Barium and manganese were detected in the treated materials at concentrations ranging from 291 to 676 mg/kg. Several other metals were detected at total concentrations of less than 300 mg/kg.

SPLP TAL Metals Analyses

Table 35 presents the results of SPLP TAL metals analyses performed on the 28 day cure treated materials. The majority of the metals were detected at concentrations of less than 1 mg/L. Calcium and sodium were detected at the highest concentrations ranging from 150 to 470 mg/L. Potassium concentrations ranged from 8.4 to 10 mg/L, while SPLP copper concentrations ranged from 1.4 to 3.1 mg/L. Note that SPLP lead concentrations were non-detectable in the mixtures developed with cement, and exhibited concentrations of 0.17 and 0.096 mg/L in the mixtures developed with a combination of cement and hydrated lime. SPLP arsenic concentrations ranged from 0.0098 to 0.014 mg/L. All remaining metals were found at SPLP concentrations of less than 0.41 mg/L.

Unconfined Compressive Strength Testing

Unconfined compressive strength results are presented in Table 36. A review of the results indicates that the treated materials exhibited strengths ranging from 42 to 84 lbs/in². The materials developed with Type I Portland cement alone exhibited strengths of 71 and 84 lbs/in², while the materials developed with a combination of cement and lime

exhibited strengths of 53 and 42 lbs/in². Volumetric expansion results indicate that the materials developed with a combination of cement and lime exhibited much higher increases than those developed with only cement. Specifically, the mixtures developed with cement exhibited volumetric increases of 4 and 7%, while the mixtures developed with a combination of cement and lime exhibited increases of 32%. The larger volume increase is likely due to the low density of the hydrated lime reagent and subsequent bulking that takes place.

A review of the results of treated evaluations performed on the four treated materials indicates that a combination of air stripping and s/s treatment were capable of reducing the leachable concentrations of both organic and inorganic compounds while significantly improving the physical properties of the untreated material. Additional review of the treated evaluations indicate that iron was not capable of further reducing leachable organic or inorganic concentrations and as a result the additional cost necessary for full-scale implementation would not be cost effective.

5.5 PHASE IV CONTROL SAMPLE

In order to identify the relative reduction in contaminants solely as a result of handling, mixing and exposure to the environment, Kiber utilized a control sample throughout all of Phase IV testing. The control sample was obtained from the same untreated bucket as the Phase IV parent materials. Once a sufficient aliquot had been sampled from the original untreated bucket a sample was obtained and subjected to analytical characterization analyses. The remaining control sample was then placed into a Ziploc bag and allowed to set open any time that the mixtures were exposed to the outside air. When the mixtures were mixed or amended with iron, the control sample was also mixed to mimic the treatment process. During the three days after iron addition, the mixtures and control sample were sealed in Ziploc bags. Note that Kiber removed as much air as possible prior to sealing the Ziploc bags. After three days, all of the Ziploc bags were opened and the control sample was sampled in addition to the mixtures. While the mixtures were treated with the specified stabilization reagents, the control sample was again mixed to simulate the mixing in of reagents. Upon completion of mixture development, all materials were again sealed in Ziploc bags for a period of 28 days. Upon reaching 28 days of curing the

control sample was again sampled and subjected to analytical analyses. At each sampling interval, the control sample was subjected to the following analytical analyses in accordance with the referenced test methods:

| | |
|-----------------|------------------|
| Total Volatiles | EPA Method 8260B |
| Total PCBs | EPA Method 8081 |
| Total Chloride | EPA Method 325.2 |

The results of characterization analyses performed on the control samples are presented in Tables 37 and 38. Table 37 includes the results of total volatile organic analyses, and Table 38 includes the results of total PCB and chloride analyses. Analytical data reports are included in Appendix E.

Volatile Organic Analyses

A review of the results of total volatile organic analyses performed on the control samples, as presented in Table 37, indicate reduction in volatile organic concentrations from the initial to the final control. Specifically, tetrachloroethene reduced from 4,300,000 ug/kg to 1,400,000 ug/kg, while toluene reduced from 4,100,000 to 790,000 ug/kg. Trichloroethene concentrations reduced from 5,500,000 ug/kg to 710,000 ug/kg, and m-xylene concentrations reduced from 2,800,000 to 920,000 ug/kg. Several other compounds exhibited a reduction in concentrations from the initial control sample to the final control sample.

Total PCB and Chloride Analyses

Table 38 presents the results of total PCB and chloride analyses performed on the control sample. Note that Aroclor-1242, which was the only aroclor compound detected, was found in the initial control sample at 1,600,000 ug/kg and in the final control sample at 620,000 ug/kg. Total chloride concentrations increased from 2,700 mg/kg in the initial control sample to 8,500 mg/kg in the final control sample.

Due to the heterogeneity of the material it is difficult to identify whether these concentrations represent a true reduction or whether the reduction is a result of analyzing a less contaminated aliquot during the analyses of the final control sample.

6.0 QUALITY ASSURANCE / QUALITY CONTROL

Kiber maintains strict Quality Assurance (QA) and Quality Control (QC) programs as part of Kiber's standard operating procedures. The QA/QC program for the 216 Paterson Plank Road site treatability study had two primary objectives 1) to validate the quality of each analysis conducted in accordance with the referenced protocols, and 2) to evaluate the effectiveness of each treatment process on the chemical treatment of the site materials. The treatability and analytical testing procedures implemented throughout the study were known, tested and approved EPA and ASTM methodologies.

The objectives of the treatability study were achieved for treatability testing through 1) calibration of the associated equipment, and 2) supervision and review by qualified technical personnel. All treatability testing was supervised by personnel experienced in both laboratory evaluations and full-scale application of the treatment processes.

All equipment associated with the treatability testing is calibrated on a regular basis, as specified by the manufacturer. Daily monitoring and calibration was also performed on common laboratory equipment including pH meters, ovens, and balances.

The analytical QA/QC program was developed in accordance with EPA's Level III QA/QC standards as outlined in *Preparation Aids for the Development of Category III Quality Assurance Project Plans*. Specifically, the objectives of the QA/QC program were to ensure that the data generated was comparable, accurate, reproducible, valid, and defensible. All QA/QC testing was applied to the initial phase of the 216 Paterson Plank Road site treatability study on a batch-specific basis. The program included analyses of method blanks, duplicates, blank spikes, laboratory control samples, and surrogate recoveries, as appropriate. Complete QA/QC data is reported with the full data reports presented in each of the referenced appendices. Any sample-specific observations are reported on the appropriate data reports.



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TABLES

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 1
Phase I: Baseline Characterization
Summary of Total Volatile Organic Analyses - EPA Method 8260B**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | |
|-----------------------------|---------------------|-----------|-----------|-----------|-----------|-----------|
| | A | | B | | C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | |
| Acetone | 300,000 J | 2,000,000 | 220,000 J | 1,700,000 | 320,000 J | 2,400,000 |
| Benzene | 43,000 J | 99,000 | 31,000 J | 87,000 | 45,000 J | 120,000 |
| Bromobenzene | - | 99,000 | - | 87,000 | - | 120,000 |
| Bromochloromethane | - | 99,000 | - | 87,000 | - | 120,000 |
| Bromodichloromethane | - | 99,000 | - | 87,000 | - | 120,000 |
| Bromoform | - | 99,000 | - | 87,000 | - | 120,000 |
| Bromomethane | - | 200,000 | - | 170,000 | - | 120,000 |
| 2-butanone | 240,000 J | 2,000,000 | 170,000 J | 1,700,000 | - | 240,000 |
| n-Butylbenzene | - | 99,000 | - | 87,000 | - | 2,400,000 |
| s-Butylbenzene | - | 99,000 | - | 87,000 | - | 120,000 |
| t-Butylbenzene | - | 99,000 | - | 87,000 | - | 120,000 |
| Carbon disulfide | - | 99,000 | - | 87,000 | - | 120,000 |
| Carbon tetrachloride | - | 99,000 | - | 87,000 | - | 120,000 |
| Chlorobenzene | 210,000 | 99,000 | 160,000 | 87,000 | 210,000 | 120,000 |
| Chlorodibromomethane | - | 99,000 | - | 87,000 | - | 120,000 |
| Chloroethane | - | 200,000 | - | 170,000 | - | 240,000 |
| 2-Chloroethyl vinyl ether | - | 200,000 | - | 170,000 | - | 240,000 |
| Chloroform | 140,000 | 99,000 | 97,000 | 87,000 | 140,000 | 120,000 |
| Chloromethane | - | 200,000 | - | 170,000 | - | 240,000 |
| 2-Chlorotoluene | - | 99,000 | - | 87,000 | - | 120,000 |
| 4-Chlorotoluene | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,2-Dibromo-3-Chloropropane | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,2-Dibromoethane | - | 99,000 | - | 87,000 | - | 120,000 |
| Dibromomethane | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,2-Dichlorobenzene | 190,000 | 99,000 | 160,000 | 87,000 | 170,000 | 120,000 |
| 1,3-Dichlorobenzene | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,4-Dichlorobenzene | - | 99,000 | - | 87,000 | - | 120,000 |
| Dichlorodifluoromethane | - | 200,000 | - | 170,000 | - | 240,000 |
| 1,1-Dichloroethane | 130,000 | 99,000 | 100,000 | 87,000 | 170,000 | 120,000 |
| 1,2-Dichloroethane | 76,000 J | 99,000 | 58,000 J | 87,000 | 69,000 J | 120,000 |
| 1,1-Dichloroethene | - | 99,000 | - | 87,000 | - | 120,000 |
| cis-1,2-Dichloroethene | 41,000 J | 99,000 | 32,000 J | 87,000 | - | 120,000 |
| trans-1,2-Dichloroethene | - | 99,000 | - | 87,000 | 53,000 J | 120,000 |
| 1,2-Dichloropropane | 15,000 J | 99,000 | 10,000 J | 87,000 | - | 120,000 |
| 1,3-Dichloropropane | - | 99,000 | - | 87,000 | 15,000 J | 120,000 |

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 1
Phase I: Baseline Characterization
Summary of Total Volatile Organic Analyses - EPA Method 8260B**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | |
|-----------------------------|---------------------|---------|-----------|---------|-----------|---------|
| | A | | B | | C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | |
| 2,2-Dichloropropane | - | 99,000 | - | 87,000 | - | 120,000 |
| cis-1,3-Dichloropropene | - | 99,000 | - | 87,000 | - | 120,000 |
| trans-1,3-Dichloropropene | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,1-Dichloropropene | - | 99,000 | - | 87,000 | - | 120,000 |
| Ethylbenzene | 980,000 | 99,000 | 740,000 | 87,000 | 1,100,000 | 120,000 |
| 2-Hexanone | - | 200,000 | - | 170,000 | - | 240,000 |
| Hexachlorobutadiene | - | 99,000 | - | 87,000 | - | 120,000 |
| Isopropyl benzene | 36,000 J | 99,000 | 28,000 J | 87,000 | 42,000 J | 120,000 |
| p-isopropyltoluene | - | 99,000 | - | 87,000 | 13,000 J | 120,000 |
| 4-Methyl-2-pentanone (MIBK) | 310,000 | 200,000 | 220,000 | 170,000 | 290,000 | 240,000 |
| Methylene chloride | 140,000 | 99,000 | 100,000 | 87,000 | 140,000 | 120,000 |
| Naphthalene | 69,000 J | 200,000 | 58,000 J | 170,000 | 80,000 J | 240,000 |
| n-Propyl benzene | 100,000 | 99,000 | 78,000 J | 87,000 | 110,000 J | 120,000 |
| Styrene | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,1,1,2-Tetrachloroethane | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,1,2,2-Tetrachloroethane | - | 99,000 | - | 87,000 | - | 120,000 |
| Tetrachloroethene | 6,600,000 | 99,000 | 4,900,000 | 87,000 | 7,100,000 | 120,000 |
| Toluene | 6,400,000 | 99,000 | 5,200,000 | 87,000 | 7,500,000 | 120,000 |
| 1,2,3-Trichlorobenzene | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,2,4-Trichlorobenzene | - | 99,000 | - | 87,000 | 6,800 J | 120,000 |
| 1,1,1-Trichloroethane | 990,000 | 99,000 | 790,000 | 87,000 | 930,000 | 120,000 |
| 1,1,2-Trichloroethane | - | 99,000 | - | 87,000 | - | 120,000 |
| Trichloroethene | 8,800,000 | 99,000 | 6,800,000 | 87,000 | 9,500,000 | 120,000 |
| Trichlorofluoromethane | - | 200,000 | - | 170,000 | - | 240,000 |
| 1,2,3-Trichloropropane | - | 99,000 | - | 87,000 | - | 120,000 |
| 1,2,4-Trimethylbenzene | 120,000 | 99,000 | 95,000 | 87,000 | 130,000 | 120,000 |
| 1,3,5-Trimethylbenzene | 140,000 | 99,000 | 110,000 | 87,000 | 160,000 | 120,000 |
| Vinyl Acetate | - | 200,000 | - | 170,000 | - | 240,000 |
| Vinyl Chloride | - | 200,000 | - | 170,000 | - | 240,000 |
| o-xylene | 1,100,000 | 99,000 | 820,000 | 87,000 | 1,200,000 | 120,000 |
| m-xylene | 4,100,000 | 99,000 | 3,100,000 | 87,000 | 4,300,000 | 120,000 |
| p-xylene | - | 99,000 | - | 87,000 | - | 120,000 |

(1) A, B and C represent triplicate aliquots of the untreated material.

DL Detection Limit

J Estimated Value

- Non Detectable concentrations

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 2
Phase I: Baseline Characterization
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B

| ANALYTICAL PARAMETER | RESULTS (ug/L) (1) | | | | | |
|-----------------------------|--------------------|--------|--------|--------|--------|--------|
| | A | | B | | C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | | | |
| Acetone | 13,000 | 10,000 | 12,000 | 10,000 | 13,000 | 10,000 |
| Benzene | 710 | 500 | 830 | 500 | 680 | 500 |
| Bromobenzene | - | 500 | - | 500 | - | 500 |
| Bromochloromethane | - | 500 | - | 500 | - | 500 |
| Bromodichloromethane | - | 500 | - | 500 | - | 500 |
| Bromoform | - | 500 | - | 500 | - | 500 |
| Bromomethane | - | 1,000 | - | 1,000 | - | 1,000 |
| 2-Butanone | 10,000 | 10,000 | 9,300 | 10,000 | 10,000 | 10,000 |
| n-Butylbenzene | 67 J | 500 | - | 500 | - | 500 |
| s-Butylbenzene | 51 J | 500 | - | 500 | - | 500 |
| t-Butylbenzene | 45 J | 500 | - | 500 | - | 500 |
| Carbon disulfide | - | 500 | - | 500 | - | 500 |
| Carbon tetrachloride | - | 500 | - | 500 | - | 500 |
| Chlorobenzene | 1,500 | 500 | 1,400 | 500 | 1,500 | 500 |
| Chlorodibromomethane | - | 500 | - | 500 | - | 500 |
| Chloroethane | - | 1,000 | - | 1,000 | - | 1,000 |
| 2-Chloroethyl vinyl ether | - | 1,000 | - | 1,000 | - | 1,000 |
| Chloroform | 3,100 | 500 | 4,200 | 500 | 3,400 | 500 |
| Chloromethane | - | 1,000 | - | 1,000 | - | 1,000 |
| 2-Chlorotoluene | - | 500 | - | 500 | - | 500 |
| 4-Chlorotoluene | - | 500 | - | 500 | - | 500 |
| 1,2-Dibromo-3-Chloropropane | - | 500 | - | 500 | - | 500 |
| 1,2-Dibromoethane | - | 500 | - | 500 | - | 500 |
| Dibromomethane | - | 500 | - | 500 | - | 500 |
| 1,2-Dichlorobenzene | 500 J | 500 | 430 J | 500 | 530 | 500 |
| 1,3-Dichlorobenzene | - | 500 | - | 500 | - | 500 |
| 1,4-Dichlorobenzene | - | 500 | - | 500 | - | 500 |
| Dichlorodifluoromethane | - | 1,000 | - | 1,000 | - | 1,000 |
| 1,1-Dichloroethane | 3,200 | 500 | 3,400 | 500 | 2,800 | 500 |
| 1,2-Dichloroethane | 3,200 | 500 | 3,000 | 500 | 3,900 | 500 |
| 1,1-Dichloroethene | 94 J | 500 | 98 J | 500 | 91 J | 500 |
| cis-1,2-Dichloroethene | 1,000 | 500 | 1,100 | 500 | 880 | 500 |
| trans-1,2-Dichloroethene | - | 500 | - | 500 | - | 500 |
| 1,2-Dichloropropane | 280 J | 500 | 380 J | 500 | 300 J | 500 |
| 1,3-Dichloropropane | - | 500 | - | 500 | - | 500 |

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 2
Phase I: Baseline Characterization
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B**

| ANALYTICAL PARAMETER | RESULTS (ug/L) (1) | | | | | |
|-----------------------------|--------------------|-------|--------|-------|--------|-------|
| | A | | B | | C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | | | |
| 2,2-Dichloropropane | - | 500 | - | 500 | - | 500 |
| cis-1,3-Dichloropropene | - | 500 | - | 500 | - | 500 |
| trans-1,3-Dichloropropene | - | 500 | - | 500 | - | 500 |
| 1,1-Dichloropropene | - | 500 | - | 500 | - | 500 |
| Ethylbenzene | 2,900 | 500 | 2,900 | 500 | 3,000 | 500 |
| 2-Hexanone | - | 1,000 | - | 1,000 | - | 1,000 |
| Hexachlorobutadiene | 49 J | 500 | - | 500 | - | 500 |
| Isopropyl benzene | 57 J | 500 | 38 J | 500 | 45 J | 500 |
| p-isopropyltoluene | 53 J | 500 | - | 500 | - | 500 |
| 4-Methyl-2-pentanone (MIBK) | 12,000 | 1,000 | 12,000 | 1,000 | 11,000 | 1,000 |
| Methylene chloride | 3,800 | 500 | 5,000 | 500 | 5,000 | 500 |
| Naphthalene | 250 J | 1,000 | 150 J | 1,000 | 150 J | 1,000 |
| n-Propyl benzene | 110 J | 500 | 84 J | 500 | 110 J | 500 |
| Styrene | - | 500 | - | 500 | - | 500 |
| 1,1,1,2-Tetrachloroethane | - | 500 | - | 500 | - | 500 |
| 1,1,2,2-Tetrachloroethane | - | 500 | - | 500 | - | 500 |
| Tetrachloroethene | 14,000 | 500 | 15,000 | 500 | 16,000 | 500 |
| Toluene | 50,000 | 5,000 | 51,000 | 5,000 | 49,000 | 5,000 |
| 1,2,3-Trichlorobenzene | 120 J | 500 | - | 500 | - | 500 |
| 1,2,4-Trichlorobenzene | 95 J | 500 | - | 500 | - | 500 |
| 1,1,1-Trichloroethane | 13,000 | 500 | 14,000 | 500 | 14,000 | 500 |
| 1,1,2-Trichloroethane | 190 J | 500 | 300 J | 500 | 240 J | 500 |
| Trichloroethene | 84,000 | 5,000 | 89,000 | 5,000 | 86,000 | 5,000 |
| Trichlorofluoromethane | - | 1,000 | - | 1,000 | - | 1,000 |
| 1,2,3-Trichloropropane | - | 500 | - | 500 | - | 500 |
| 1,2,4-Trimethylbenzene | 470 J | 500 | 460 J | 500 | 550 | 500 |
| 1,3,5-Trimethylbenzene | 150 J | 500 | 130 J | 500 | 160 J | 500 |
| Vinyl Acetate | - | 1,000 | - | 1,000 | - | 1,000 |
| Vinyl Chloride | 290 J | 1,000 | 330 J | 1,000 | 260 J | 1,000 |
| o-xylene | 3,300 | 500 | 3,400 | 500 | 3,400 | 500 |
| m-xylene | 10,000 | 500 | 11,000 | 500 | 11,000 | 500 |
| p-xylene | - | 500 | - | 500 | - | 500 |

(1) A, B and C represent triplicate aliquots of the untreated material.

DL Detection Limit

J Estimated Value

- Non Detectable concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 3
Phase I: Baseline Characterization
Summary of Total Pesticide / PCB Analyses - EPA Method 8081/8082**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | |
|----------------------------|---------------------|---------|---------|--------|---------|---------|
| | A | | B | | C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL PESTICIDES | | | | | | |
| alpha-BHC | - | 260 | - | 230 | - | 310 |
| beta-BHC | - | 260 | - | 230 | - | 310 |
| delta-BHC | - | 260 | - | 230 | - | 310 |
| Heptachlor | - | 260 | - | 230 | - | 310 |
| Aldrin | - | 260 | - | 230 | - | 310 |
| Heptachlor epoxide | - | 260 | - | 230 | - | 310 |
| Endosulfan I | - | 260 | - | 230 | - | 310 |
| Dieldrin | - | 260 | - | 230 | - | 310 |
| 4,4'-DDE | 4,700 | 520 | 9,600 | 460 | 13,000 | 620 |
| Endrin | - | 520 | - | 460 | - | 620 |
| Endosulfan II | - | 520 | - | 460 | - | 620 |
| 4,4'-DDD | - | 520 | - | 460 | - | 620 |
| Endosulfan Sulfate | - | 520 | - | 460 | - | 620 |
| 4,4'-DDT | - | 520 | - | 460 | - | 620 |
| Methoxychlor | - | 2,600 | - | 2,300 | - | 3,100 |
| Endrin Ketone | - | 520 | - | 460 | - | 620 |
| Endrin aldehyde | - | 520 | - | 460 | - | 620 |
| alpha-Chlordane | - | 260 | - | 230 | - | 310 |
| gamma-Chlordane | - | 260 | - | 230 | - | 310 |
| Toxaphene | - | 5,200 | - | 4,600 | - | 6,200 |
| gamma-BHC (Lindane) | - | 260 | - | 230 | - | 310 |
| II. TOTAL PCBs | | | | | | |
| Aroclor-1016 | - | 52 | - | 46 | - | 62 |
| Aroclor-1221 | - | 52 | - | 46 | - | 62 |
| Aroclor-1232 | - | 52 | - | 46 | - | 62 |
| Aroclor-1242 | 630,000 | 260,000 | 330,000 | 46,000 | 990,000 | 310,000 |
| Aroclor-1248 | - | 52 | - | 46 | - | 62 |
| Aroclor-1254 | - | 52 | - | 46 | - | 62 |
| Aroclor-1260 | - | 52 | - | 46 | - | 62 |

(1) A, B and C represent triplicate aliquots of the untreated material.

DL Detection Limit

- Non Detectable Concentrations

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 4
Phase I: Baseline Characterization
Summary of SPLP Pesticide / PCB Analyses - EPA Methods 1312/8081/8082

| ANALYTICAL PARAMETER | RESULTS (ug/L) (1) | | | | | |
|-------------------------|--------------------|------|-------|------|-------|------|
| | A | | B | | C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| LSPLP PESTICIDES | | | | | | |
| alpha-BHC | - | 5.0 | - | 5.0 | - | 5.0 |
| beta-BHC | - | 5.0 | - | 5.0 | - | 5.0 |
| delta-BHC | - | 5.0 | - | 5.0 | - | 5.0 |
| Heptachlor | - | 5.0 | - | 5.0 | - | 5.0 |
| Aldrin | - | 5.0 | - | 5.0 | - | 5.0 |
| Heptachlor epoxide | - | 5.0 | - | 5.0 | - | 5.0 |
| Endosulfan I | - | 5.0 | - | 5.0 | - | 5.0 |
| Dieldrin | 60 | 10 | 43 | 10 | 45 | 10 |
| 4,4'-DDE | - | 10 | - | 10 | - | 10 |
| Endrin | - | 10 | - | 10 | - | 10 |
| Endosulfan II | - | 10 | - | 10 | - | 10 |
| 4,4'-DDD | - | 10 | - | 10 | - | 10 |
| Endosulfan Sulfate | - | 10 | - | 10 | - | 10 |
| 4,4'-DDT | - | 10 | - | 10 | - | 10 |
| Methoxychlor | - | 50 | - | 50 | - | 50 |
| Endrin Ketone | - | 10 | - | 10 | - | 10 |
| Endrin aldehyde | - | 10 | - | 10 | - | 10 |
| alpha-Chlordane | - | 5.0 | - | 5.0 | - | 5.0 |
| gamma-Chlordane | - | 5.0 | - | 5.0 | - | 5.0 |
| Toxaphene | - | 100 | - | 100 | - | 100 |
| gamma-BHC (Lindane) | - | 5.0 | - | 5.0 | - | 5.0 |
| II. SPLP PCBs | | | | | | |
| Aroclor-1016 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1221 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1232 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1242 | 5,000 | 500 | 3,300 | 500 | 4,400 | 500 |
| Aroclor-1248 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1254 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1260 | - | 0.50 | - | 0.50 | - | 0.50 |

(1) A, B and C represent triplicate aliquots of the untreated material.

DL Detection Limit

- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 5
Phase I: Baseline Characterization
Summary of Additional Chemical and Physical Analyses**

| ANALYTICAL PARAMETER | UNIT | RESULTS (1) | | |
|--------------------------------|--------------------|-------------|-------|-------|
| | | A | B | C |
| I. CHEMICAL ANALYSES | | | | |
| Total Lead | mg/kg | 860 | 770 | 1,200 |
| SPLP Lead | mg/L | 2.6 | 3.2 | 3.6 |
| Total Arsenic | mg/kg | 13 | 13 | 18 |
| SPLP Arsenic | mg/L | <0.10 | <0.10 | <0.10 |
| Total Chloride | mg/kg | 1,200 | 2,700 | 5,700 |
| Material pH | s.u. | 8.9 | 9.2 | 9.1 |
| II. PHYSICAL PROPERTIES | | | | |
| Ignitability, Flash Point | °C | 35 | 39 | 39 |
| Moisture Content, Dry Basis | % | 58 | 62 | 59 |
| Bulk Density | lb/ft ³ | 95 | 95 | 95 |
| Bulk Specific Gravity | - | 1.5 | 1.5 | 1.5 |

(1) A, B, and C represent multiple aliquots of the untreated material.
- Not applicable or Not Analyzed

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 6
Phase II: Screening Tests
Summary of Mixture Development and Monitoring**

| KIBER SAMPLE No. | REAGENT TYPE (1) | REAGENT ADDITION (%) (2) | WATER ADDITION (%) (2) | PENETROMETER STRENGTH TESTING (tons/ft ²) | | | | | | |
|------------------------|---|--------------------------------|------------------------------|--|------------------------|-------|-------|--------|--------|--------|
| | | | | 1 Day | 2 Day | 3 Day | 7 Day | 14 Day | 19 Day | 21 Day |
| | | | | 2964-001 | Type I Portland Cement | 10 | 8 | <0.5 | <0.5 | <0.5 |
| 2964-002 | Type I Portland Cement | 20 | 16 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 1.0 | 1.0 |
| 2964-003 | Type I Portland Cement | 30 | 17.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 | 0.5 |
| 2964-004 | Type I Portland Cement | 40 | 20 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 1.0 | 2.0 |
| 2964-005 | Type I Portland Cement | 50 | 25 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 1.5 | 2.5 |
| 2964-006 | Type I Portland Cement / Organophillic Clay | 20 / 3 | 16 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 1.5 | 1.5 |
| 2964-007 | Type I Portland Cement / Organophillic Clay | 40 / 3 | 28 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 |
| 2964-008 | Type I Portland Cement / Organophillic Clay | 20 / 5 | 25 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 |
| 2964-009 | Type I Portland Cement / Organophillic Clay | 40 / 5 | 27 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 1.0 |
| 2964-010 | Type I Portland Cement / Organophillic Clay | 40 / 7 | 30 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 1.0 |
| 2964-011 | Type I Portland Cement / Hydrated Lime | 10 / 10 | 27.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 |
| 2964-012 | Type I Portland Cement / Hydrated Lime | 20 / 20 | 40 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 |

(1) All reagents will be blended dry, slurried with water and added to the untreated material and blended.

(2) For a mixture with 10% reagent addition and 10% water addition, 20 grams of reagent will be slurried with 20 grams of water and added to 200 grams of untreated material.

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 7
Phase II: Screening Tests
Summary of Unconfined Compressive Strength Testing - ASTM D 2166**

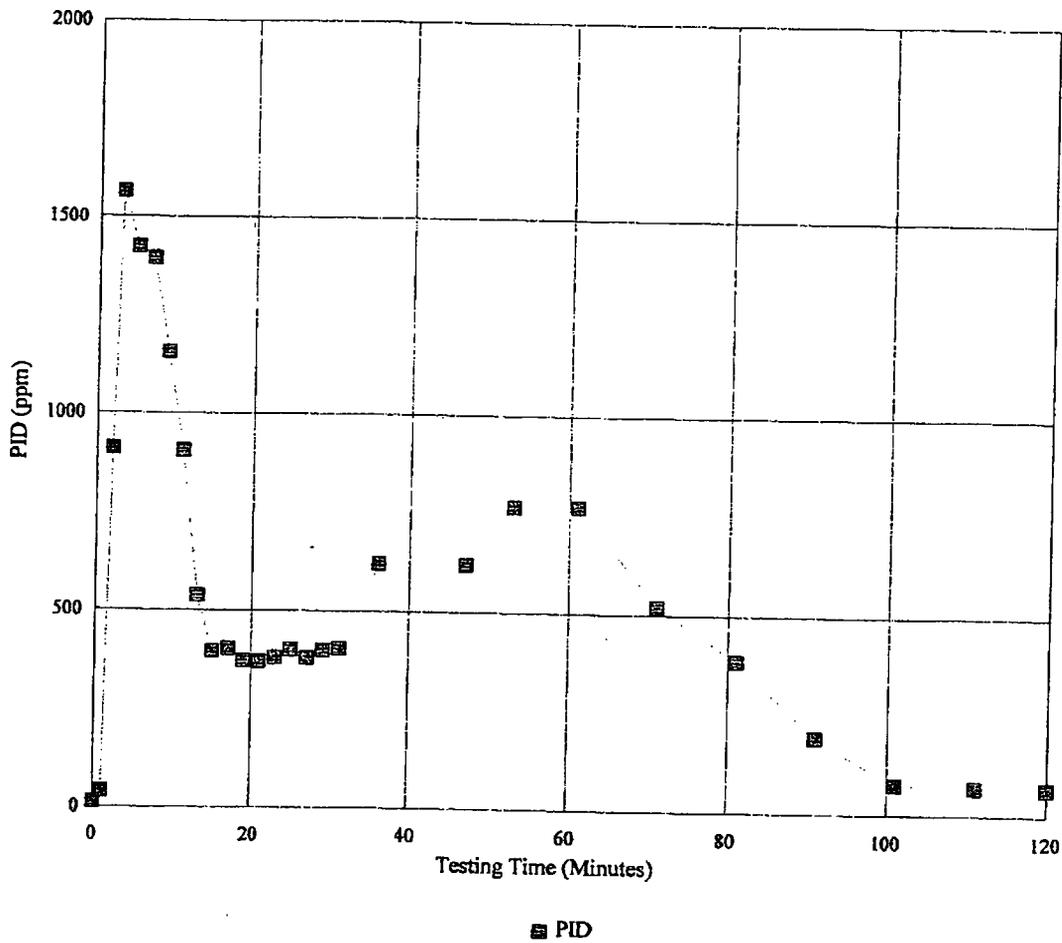
| KIBER SAMPLE No. | REAGENT TYPE (1) | REAGENT ADDITION (%) (2) | WATER ADDITION (%) (2) | UNCONFINED COMPRESSIVE STRENGTH TESTING (UCS) (3) | | | |
|------------------------|---|--------------------------------|------------------------------|---|---|--|-------------------------------|
| | | | | Moisture Content (%) | Bulk Density (lbs/ft ³) | Dry Density (lbs/ft ³) | UCS (lbs/in ²) |
| 2964-001 | Type I Portland Cement | 10 | 8 | 42 | 101 | 71 | 14 |
| 2964-002 | Type I Portland Cement | 20 | 16 | 44 | 100 | 69 | 11 |
| 2964-003 | Type I Portland Cement | 30 | 17.5 | - | - | - | - |
| 2964-004 | Type I Portland Cement | 40 | 20 | 41 | 107 | 76 | 11 |
| 2964-005 | Type I Portland Cement | 50 | 25 | 37 | 106 | 77 | 14 |
| 2964-006 | Type I Portland Cement / Organophillic Clay | 20 / 3 | 16 | 44 | 102 | 71 | 14 |
| 2964-007 | Type I Portland Cement / Organophillic Clay | 40 / 3 | 28 | - | - | - | - |
| 2964-008 | Type I Portland Cement / Organophillic Clay | 20 / 5 | 25 | 51 | 97 | 64 | 6 |
| 2964-009 | Type I Portland Cement / Organophillic Clay | 40 / 5 | 27 | 44 | 101 | 70 | 12 |
| 2964-010 | Type I Portland Cement / Organophillic Clay | 40 / 7 | 30 | - | - | - | - |
| 2964-011 | Type I Portland Cement / Hydrated Lime | 10 / 10 | 27.5 | - | - | - | - |
| 2964-012 | Type I Portland Cement / Hydrated Lime | 20 / 20 | 40 | 52 | 95 | 63 | 15 |

- (1) All reagents will be blended dry, slurried with water and added to the untreated material and blended.
(2) For a mixture with 10% reagent addition and 10% water addition, 20 grams of reagent will be slurried with 20 grams of water and added to 200 grams of untreated material.
(3) Unconfined compressive strength testing was performed after 21 days of curing.
- Testing Not Performed

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 8
Phase III: Intermediate Tests - Air Stripping
Summary of Glove Bag Setup and Monitoring
(Air Stripping)**

| UNTREATED MATERIAL TYPE | UNTREATED MASS (g) | AIR INFLOW (lpm) | AIR OUTFLOW (lpm) | AIR STRIPPING DURATION (min) | AIR STRIPPING FLOW RATE (lpm) | MAXIMUM PID (ppm.) |
|-------------------------|--------------------|------------------|-------------------|------------------------------|-------------------------------|--------------------|
| Untreated | 1,500 | 3 | 3 | 120 | 5 | 1,566 |



KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 9
Phase III: Intermediate Tests - Air Stripping
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Air Stripped Soil)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | | | | | |
|-----------------------------|---------------------|-----------|------------|-----------|------------|-----------|------------|-----------|-------------|-----------|
| | 0 Minutes | | 10 Minutes | | 30 Minutes | | 60 Minutes | | 120 Minutes | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | | | | | |
| Acetone | - | 2,000,000 | 77,000 J | 1,900,000 | 67,000 J | 1,900,000 | - | 1,900,000 | - | 1,900,000 |
| Benzene | 27,000 J | 98,000 | 8,500 J | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Bromobenzene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Bromochloromethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Bromodichloromethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Bromoform | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Bromomethane | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| 2-butanone | 190,000 J | 2,000,000 | 86,000 J | 1,900,000 | 48,000 J | 1,900,000 | - | 1,900,000 | - | 1,900,000 |
| n-Butylbenzene | 33,000 J | 98,000 | 26,000 J | 96,000 | 23,000 J | 95,000 | 21,000 J | 1,900,000 | 16,000 J | 93,000 |
| s-Butylbenzene | 7,700 J | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| t-Butylbenzene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Carbon disulfide | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Carbon tetrachloride | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Chlorobenzene | 190,000 | 98,000 | 110,000 | 96,000 | 77,000 J | 95,000 | 50,000 J | 95,000 | 27,000 J | 93,000 |
| Chlorodibromomethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Chloroethane | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| 2-Chloroethyl vinyl ether | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| Chloroform | 72,000 J | 98,000 | 20,000 J | 96,000 | 8,200 J | 95,000 | - | 95,000 | - | 93,000 |
| Chloromethane | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| 2-Chlorotoluene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 4-Chlorotoluene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2-Dibromo-3-Chloropropane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2-Dibromoethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Dibromomethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2-Dichlorobenzene | 190,000 | 98,000 | 130,000 | 96,000 | 120,000 | 95,000 | 110,000 | 95,000 | 81,000 J | 93,000 |
| 1,3-Dichlorobenzene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,4-Dichlorobenzene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Dichlorodifluoromethane | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| 1,1-Dichloroethane | 66,000 J | 98,000 | 12,000 J | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2-Dichloroethane | 59,000 J | 98,000 | 18,000 J | 96,000 | 8,900 J | 95,000 | - | 95,000 | - | 93,000 |
| 1,1-Dichloroethene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| cis-1,2-Dichloroethene | 25,000 J | 98,000 | 5,500 J | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| trans-1,2-Dichloroethene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2-Dichloropropane | 9,100 J | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,3-Dichloropropane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 9
Phase III: Intermediate Tests - Air Stripping
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Air Stripped Soil)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | | | | | |
|-----------------------------|---------------------|---------|------------|---------|------------|---------|------------|---------|-------------|---------|
| | 0 Minutes | | 10 Minutes | | 30 Minutes | | 60 Minutes | | 120 Minutes | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | | | | | |
| 2,2-Dichloropropane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| cis-1,3-Dichloropropene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| trans-1,3-Dichloropropene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,1-Dichloropropene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Ethylbenzene | 730,000 | 98,000 | 490,000 | 96,000 | 350,000 | 95,000 | 230,000 | 95,000 | 130,000 | 93,000 |
| 2-Hexanone | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| Hexachlorobutadiene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Isopropyl benzene | 28,000 J | 98,000 | 22,000 J | 96,000 | 17,000 J | 95,000 | 12,000 J | 95,000 | 7,800 J | 93,000 |
| p-isopropyltoluene | 13,000 J | 98,000 | 7,500 J | 96,000 | 6,700 J | 95,000 | 5,900 J | 95,000 | - | 93,000 |
| 4-Methyl-2-pentanone (MIBK) | 250,000 | 200,000 | 130,000 J | 190,000 | 77,000 J | 190,000 | 38,000 J | 190,000 | - | 190,000 |
| Methylene chloride | 55,000 J | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Naphthalene | 58,000 J | 200,000 | 46,000 J | 190,000 | 45,000 J | 190,000 | 44,000 J | 190,000 | 36,000 J | 190,000 |
| n-Propyl benzene | 77,000 J | 98,000 | 60,000 J | 96,000 | 48,000 J | 95,000 | 38,000 J | 95,000 | 25,000 J | 93,000 |
| Styrene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,1,1,2-Tetrachloroethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,1,2,2-Tetrachloroethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Tetrachloroethene | 5,800,000 | 98,000 | 2,900,000 | 96,000 | 1,800,000 | 95,000 | 1,100,000 | 95,000 | 610,000 | 93,000 |
| Toluene | 5,900,000 | 98,000 | 2,400,000 | 96,000 | 1,400,000 | 95,000 | 740,000 | 95,000 | 370,000 | 93,000 |
| 1,2,3-Trichlorobenzene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2,4-Trichlorobenzene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,1,1-Trichloroethane | 700,000 | 98,000 | 230,000 | 96,000 | 89,000 J | 95,000 | 38,000 J | 95,000 | 16,000 J | 93,000 |
| 1,1,2-Trichloroethane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| Trichloroethene | 8,000,000 | 98,000 | 2,600,000 | 96,000 | 1,200,000 | 95,000 | 560,000 | 95,000 | 260,000 | 93,000 |
| Trichlorofluoromethane | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| 1,2,3-Trichloropropane | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |
| 1,2,4-Trimethylbenzene | 300,000 | 98,000 | 240,000 | 96,000 | 210,000 | 95,000 | 180,000 | 95,000 | 130,000 | 93,000 |
| 1,3,5-Trimethylbenzene | 110,000 | 98,000 | 86,000 J | 96,000 | 68,000 J | 95,000 | 61,000 J | 95,000 | 43,000 J | 93,000 |
| Vinyl Acetate | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| Vinyl Chloride | - | 200,000 | - | 190,000 | - | 190,000 | - | 190,000 | - | 190,000 |
| o-xylene | 800,000 | 98,000 | 560,000 | 96,000 | 430,000 | 95,000 | 310,000 | 95,000 | 190,000 | 93,000 |
| m-xylene | 3,000,000 | 98,000 | 2,100,000 | 96,000 | 1,500,000 | 95,000 | 1,000,000 | 95,000 | 620,000 | 93,000 |
| p-xylene | - | 98,000 | - | 96,000 | - | 95,000 | - | 95,000 | - | 93,000 |

(1) The time interval indicates that the sample was taken after the specified amount of air stripping.

DL Detection Limit

J Estimated Value

- Non Detectable concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 10
Phase III: Intermediate Tests - Air Stripping
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Carbon Cartridges)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | |
|-----------------------------|---------------------|------------|-------------|------------|-----------|------------|
| | Carbon A | | Carbon B | | Carbon C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | |
| Acetone | - | 31,000,000 | - | 71,000,000 | - | 71,000,000 |
| Benzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Bromobenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Bromochloromethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Bromodichloromethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Bromoform | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Bromomethane | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| 2-butanone | - | 31,000,000 | - | 71,000,000 | - | 71,000,000 |
| n-Butylbenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| s-Butylbenzene | 190,000 J | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| t-Butylbenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Carbon disulfide | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Carbon tetrachloride | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Chlorobenzene | 1,500,000 J | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Chlorodibromomethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Chloroethane | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| 2-Chloroethyl vinyl ether | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| Chloroform | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Chloromethane | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| 2-Chlorotoluene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 4-Chlorotoluene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2-Dibromo-3-Chloropropane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2-Dibromoethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Dibromomethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2-Dichlorobenzene | 2,400,000 | 1,600,000 | 3,500,000 J | 3,600,000 | 580,000 J | 3,600,000 |
| 1,3-Dichlorobenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,4-Dichlorobenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Dichlorodifluoromethane | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| 1,1-Dichloroethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2-Dichloroethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,1-Dichloroethene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| cis-1,2-Dichloroethene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| trans-1,2-Dichloroethene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2-Dichloropropane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,3-Dichloropropane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 10
Phase III: Intermediate Tests - Air Stripping
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Carbon Cartridges)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | |
|-----------------------------|---------------------|-----------|-------------|-----------|-------------|-----------|
| | Carbon A | | Carbon B | | Carbon C | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | |
| 2,2-Dichloropropane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| cis-1,3-Dichloropropene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| trans-1,3-Dichloropropene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,1-Dichloropropene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Ethylbenzene | 7,300,000 | 1,600,000 | 7,300,000 | 3,600,000 | 12,000,000 | 3,600,000 |
| 2-Hexanone | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| Hexachlorobutadiene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Isopropyl benzene | 490,000 J | 1,600,000 | 460,000 J | 3,600,000 | 810,000 J | 3,600,000 |
| p-isopropyltoluene | 320,000 J | 1,600,000 | 330,000 J | 3,600,000 | 220,000 J | 3,600,000 |
| 4-Methyl-2-pentanone (MIBK) | 1,500,000 J | 3,200,000 | 1,200,000 J | 7,100,000 | 2,500,000 J | 7,100,000 |
| Methylene chloride | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Naphthalene | - | 3,200,000 | - | 7,100,000 | - | 7,100,000 |
| n-Propyl benzene | 1,600,000 | 1,600,000 | 1,700,000 J | 3,600,000 | 2,500,000 J | 3,600,000 |
| Styrene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,1,1,2-Tetrachloroethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,1,2,2-Tetrachloroethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Tetrachloroethene | 27,000,000 | 1,600,000 | 29,000,000 | 3,600,000 | 40,000,000 | 3,600,000 |
| Toluene | 18,000,000 | 1,600,000 | 19,000,000 | 3,600,000 | 27,000,000 | 3,600,000 |
| 1,2,3-Trichlorobenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2,4-Trichlorobenzene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,1,1-Trichloroethane | 380,000 J | 1,600,000 | 400,000 J | 3,600,000 | 530,000 J | 3,600,000 |
| 1,1,2-Trichloroethane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| Trichloroethene | 7,900,000 | 1,600,000 | 8,800,000 | 3,600,000 | 11,000,000 | 3,600,000 |
| Trichlorofluoromethane | - | 3,100,000 | - | 7,100,000 | - | 7,100,000 |
| 1,2,3-Trichloropropane | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |
| 1,2,4-Trimethylbenzene | 6,300,000 | 1,600,000 | 8,400,000 | 3,600,000 | 2,800,000 J | 3,600,000 |
| 1,3,5-Trimethylbenzene | 2,600,000 | 1,600,000 | 3,300,000 J | 3,600,000 | 2,700,000 J | 3,600,000 |
| Vinyl Acetate | - | 3,200,000 | - | 7,100,000 | - | 7,100,000 |
| Vinyl Chloride | - | 3,200,000 | - | 7,100,000 | - | 7,100,000 |
| o-xylene | 13,000,000 | 1,600,000 | 15,000,000 | 3,600,000 | 21,000,000 | 3,600,000 |
| m-xylene | 39,000,000 | 1,600,000 | 43,000,000 | 3,600,000 | 65,000,000 | 3,600,000 |
| p-xylene | - | 1,600,000 | - | 3,600,000 | - | 3,600,000 |

(1) A, B and C represent the carbon cartridges in series. Carbon A was the carbon cartridge closest to the outside air, Carbon B represents the middle carbon and Carbon C was the carbon cartridge closest to the glovebag.

DL Detection Limit

J Estimated Value

- Non Detectable concentrations

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 11
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Parent Material)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|--------------------|---------|--------------------|---------|--------------------|-----------|--------------------|-----------|
| | A | | B | | C | | D | |
| | Mixtures 013 & 017 | | Mixtures 014 & 018 | | Mixtures 015 & 019 | | Mixtures 016 & 020 | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | | | |
| Acetone | 86,000 J | 200,000 | 670,000 | 190,000 | 130,000 J | 2,000,000 | 190,000 J | 2,000,000 |
| Benzene | 7,600 J | 9,900 | 71,000 | 9,300 | - | 100,000 | 12,000 J | 100,000 |
| Bromobenzene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Bromochloromethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Bromodichloromethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Bromoform | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Bromomethane | - | 20,000 | - | 19,000 | - | 200,000 | - | 100,000 |
| 2-butanone | 74,000 J | 200,000 | 830,000 | 190,000 | 91,000 J | 2,000,000 | 130,000 J | 2,000,000 |
| n-Butylbenzene | 16,000 | 9,900 | 180,000 | 9,300 | 16,000 J | 100,000 | 17,000 J | 100,000 |
| s-Butylbenzene | 2,900 J | 9,900 | 39,000 | 9,300 | - | 100,000 | - | 100,000 |
| t-Butylbenzene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Carbon disulfide | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Carbon tetrachloride | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Chlorobenzene | 75,000 | 9,900 | 93,000 | 9,300 | 71,000 | 100,000 | 85,000 J | 100,000 |
| Chlorodibromomethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Chloroethane | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| 2-Chloroethyl vinyl ether | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| Chloroform | 24,000 | 9,900 | 200,000 | 9,300 | 13,000 J | 100,000 | 38,000 J | 100,000 |
| Chloromethane | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| 2-Chlorotoluene | - | 9,900 | 4,400 J | 9,300 | - | 100,000 | - | 100,000 |
| 4-Chlorotoluene | - | 9,900 | 3,700 J | 9,300 | - | 100,000 | - | 100,000 |
| 1,2-Dibromo-3-Chloropropane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| 1,2-Dibromoethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Dibromomethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| 1,2-Dichlorobenzene | 82,000 | 9,900 | 110,000 | 9,300 | 84,000 J | 100,000 | 88,000 J | 100,000 |
| 1,3-Dichlorobenzene | - | 9,900 | 3,000 J | 9,300 | - | 100,000 | - | 100,000 |
| 1,4-Dichlorobenzene | 2,100 J | 9,900 | 21,000 | 9,300 | - | 100,000 | - | 100,000 |
| Dichlorodifluoromethane | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| 1,1-Dichloroethane | 12,000 | 9,900 | 140,000 | 9,300 | 7,100 J | 100,000 | 36,000 J | 100,000 |
| 1,2-Dichloroethane | 27,000 | 9,900 | 250,000 | 9,300 | 22,000 J | 100,000 | 43,000 J | 100,000 |
| 1,1-Dichloroethene | - | 9,900 | 3,500 J | 9,300 | - | 100,000 | - | 100,000 |
| cis-1,2-Dichloroethene | 6,100 J | 9,900 | 62,000 | 9,300 | - | 100,000 | 14,000 J | 100,000 |
| trans-1,2-Dichloroethene | - | 9,900 | 890 J | 9,300 | - | 100,000 | - | 100,000 |
| 1,2-Dichloropropane | 4,000 J | 9,900 | 26,000 | 9,300 | - | 100,000 | - | 100,000 |
| 1,3-Dichloropropane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 11
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Parent Material)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|-------------------------|--------|-------------------------|---------|-------------------------|---------|-------------------------|---------|
| | A Mixtures 013 & 017 | | B Mixtures 014 & 018 | | C Mixtures 015 & 019 | | D Mixtures 016 & 020 | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I TOTAL VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| cis-1,3-Dichloropropene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| trans-1,3-Dichloropropene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| 1,1-Dichloropropene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Ethylbenzene | 280,000 | 9,900 | 290,000 | 93,000 | 210,000 | 100,000 | 260,000 | 100,000 |
| 2-Hexanone | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| Hexachlorobutadiene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Isopropyl benzene | 13,000 | 9,900 | 120,000 | 9,300 | 6,600 J | 100,000 | 7,300 J | 100,000 |
| p-isopropyltoluene | 3,600 J | 9,900 | 47,000 | 9,300 | - | 100,000 | - | 100,000 |
| 4-Methyl-2-pentanone (MIBK) | 81,000 | 20,000 | 120,000 | 190,000 | - | 200,000 | 130,000 J | 200,000 |
| Methylene chloride | 15,000 | 9,900 | 160,000 | 9,300 | - | 100,000 | 46,000 J | 100,000 |
| Naphthalene | 15,000 J | 20,000 | 120,000 | 19,000 | 28,000 J | 200,000 | 33,000 J | 200,000 |
| n-Propyl benzene | 35,000 | 9,900 | 260,000 | 9,300 | 21,000 J | 100,000 | 23,000 J | 100,000 |
| Styrene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| 1,1,1,2-Tetrachloroethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| 1,1,2,2-Tetrachloroethane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| Tetrachloroethene | 700,000 | 9,900 | 1,600,000 | 93,000 | 1,300,000 | 100,000 | 1,600,000 | 100,000 |
| Toluene | 750,000 | 9,900 | 1,700,000 | 93,000 | 1,300,000 | 100,000 | 1,800,000 | 100,000 |
| 1,2,3-Trichlorobenzene | - | 9,900 | 1,500 J | 9,300 | - | 100,000 | - | 100,000 |
| 1,2,4-Trichlorobenzene | 1,300 J | 9,900 | 12,000 | 9,300 | - | 100,000 | - | 100,000 |
| 1,1,1-Trichloroethane | 170,000 | 9,900 | 200,000 | 9,300 | 130,000 | 100,000 | 310,000 | 100,000 |
| 1,1,2-Trichloroethane | 4,500 J | 9,900 | 32,000 | 9,300 | - | 100,000 | - | 100,000 |
| Trichloroethene | 740,000 | 5,000 | 1,700,000 | 93,000 | 1,300,000 | 100,000 | 2,100,000 | 100,000 |
| Trichlorofluoromethane | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| 1,2,3-Trichloropropane | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |
| 1,2,4-Trimethylbenzene | 130,000 | 9,900 | 130,000 | 93,000 | 99,000 J | 100,000 | 110,000 | 100,000 |
| 1,3,5-Trimethylbenzene | 43,000 | 9,900 | 270,000 | 9,300 | 29,000 J | 100,000 | 36,000 J | 100,000 |
| Vinyl Acetate | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| Vinyl Chloride | - | 20,000 | - | 19,000 | - | 200,000 | - | 200,000 |
| o-xylene | 310,000 | 9,900 | 320,000 | 93,000 | 220,000 | 100,000 | 270,000 | 100,000 |
| m-xylene | 500,000 | 9,900 | 1,200,000 | 93,000 | 870,000 | 100,000 | 1,000,000 | 100,000 |
| p-xylene | - | 9,900 | - | 9,300 | - | 100,000 | - | 100,000 |

DL Detection Limit
J Estimated Value
- Non Detectable concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 12
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-----------------------------|-------------------------|--------|-------------------------|--------|-------------------------|--------|-------------------------|--------|
| | A Mixtures 013 & 017 | | B Mixtures 014 & 018 | | C Mixtures 015 & 019 | | D Mixtures 016 & 020 | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | | | | | |
| Acetone | 4,200 J | 10,000 | 5,100 J | 10,000 | 5,900 J | 10,000 | 5,600 J | 10,000 |
| Benzene | 540 | 500 | 610 | 500 | 640 | 500 | 640 | 500 |
| Bromobenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| Bromochloromethane | - | 500 | - | 500 | - | 500 | - | 500 |
| Bromodichloromethane | - | 500 | - | 500 | - | 500 | - | 500 |
| Bromoform | - | 500 | - | 500 | - | 500 | - | 500 |
| Bromomethane | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| 2-butanone | 3,600 J | 10,000 | 4,600 J | 10,000 | 4,900 J | 10,000 | 4,800 J | 10,000 |
| n-Butylbenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| s-Butylbenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| t-Butylbenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| Carbon disulfide | - | 500 | - | 500 | - | 500 | - | 500 |
| Carbon tetrachloride | - | 500 | - | 500 | - | 500 | - | 500 |
| Chlorobenzene | 1,400 | 500 | 1,500 | 500 | 1,600 | 500 | 1,400 | 500 |
| Chlorodibromomethane | - | 500 | - | 500 | - | 500 | - | 500 |
| Chloroethane | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| 2-Chloroethyl vinyl ether | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| Chloroform | 2,300 | 500 | 2,600 | 500 | 2,500 | 500 | 2,700 | 500 |
| Chloromethane | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| 2-Chlorotoluene | - | 500 | - | 500 | - | 500 | - | 500 |
| 4-Chlorotoluene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,2-Dibromo-3-Chloropropane | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,2-Dibromoethane | - | 500 | - | 500 | - | 500 | - | 500 |
| Dibromomethane | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,2-Dichlorobenzene | 460 J | 500 | 520 | 500 | 530 | 500 | 470 J | 500 |
| 1,3-Dichlorobenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,4-Dichlorobenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| Dichlorodifluoromethane | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| 1,1-Dichloroethane | 1,800 | 500 | 2,300 | 500 | 2,400 | 500 | 2,800 | 500 |
| 1,2-Dichloroethane | 2,400 | 500 | 3,100 | 500 | 3,200 | 500 | 3,100 | 500 |
| 1,1-Dichloroethene | - | 500 | 48 J | 500 | 47 J | 500 | 58 J | 500 |
| cis-1,2-Dichloroethene | 640 | 500 | 750 | 500 | 820 | 500 | 910 | 500 |
| trans-1,2-Dichloroethene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,2-Dichloropropane | 240 J | 500 | 250 J | 500 | 240 J | 500 | 230 J | 500 |
| 1,3-Dichloropropane | - | 500 | - | 500 | - | 500 | - | 500 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 12
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(Parent Material)

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-----------------------------|-------------------------|-------|-------------------------|-------|-------------------------|-------|-------------------------|-------|
| | A Mixtures 013 & 017 | | B Mixtures 014 & 018 | | C Mixtures 015 & 019 | | D Mixtures 016 & 020 | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | - | 500 | - | 500 | - | 500 | - | 500 |
| cis-1,3-Dichloropropene | - | 500 | - | 500 | - | 500 | - | 500 |
| trans-1,3-Dichloropropene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,1-Dichloropropene | - | 500 | - | 500 | - | 500 | - | 500 |
| Ethylbenzene | 2,900 | 500 | 2,800 | 500 | 2,800 | 500 | 2,700 | 500 |
| 2-Hexanone | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| Hexachlorobutadiene | - | 500 | - | 500 | - | 500 | - | 500 |
| Isopropyl benzene | 41 J | 500 | 39 J | 500 | 38 J | 500 | 35 J | 500 |
| p-isopropyltoluene | - | 500 | - | 500 | - | 500 | - | 500 |
| 4-Methyl-2-pentanone (MIBK) | 5,200 | 1,000 | 6,700 | 1,000 | 7,100 | 1,000 | 6,800 | 1,000 |
| Methylene chloride | 2,700 | 500 | 3,300 | 500 | 3,300 | 500 | 3,900 | 500 |
| Naphthalene | 100 J | 1,000 | 100 J | 1,000 | 97 J | 1,000 | 90 J | 1,000 |
| n-Propyl benzene | 90 J | 500 | 86 J | 500 | 82 J | 500 | 76 J | 500 |
| Styrene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,1,1,2-Tetrachloroethane | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,1,2,2-Tetrachloroethane | - | 500 | - | 500 | - | 500 | - | 500 |
| Tetrachloroethene | 13,000 | 500 | 13,000 | 500 | 12,000 | 500 | 11,000 | 500 |
| Toluene | 41,000 | 5,000 | 48,000 | 5,000 | 42,000 | 5,000 | 45,000 | 5,000 |
| 1,2,3-Trichlorobenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,2,4-Trichlorobenzene | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,1,1-Trichloroethane | 10,000 | 500 | 12,000 | 500 | 12,000 | 500 | 12,000 | 500 |
| 1,1,2-Trichloroethane | 210 J | 500 | 210 J | 500 | 180 J | 500 | 160 J | 500 |
| Trichloroethene | 62,000 | 5,000 | 78,000 | 5,000 | 67,000 | 5,000 | 75,000 | 5,000 |
| Trichlorofluoromethane | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| 1,2,3-Trichloropropane | - | 500 | - | 500 | - | 500 | - | 500 |
| 1,2,4-Trimethylbenzene | 470 J | 500 | 440 J | 500 | 420 J | 500 | 390 J | 500 |
| 1,3,5-Trimethylbenzene | 140 J | 500 | 130 J | 500 | 120 J | 500 | 120 J | 500 |
| Vinyl Acetate | - | 1,000 | - | 1,000 | - | 1,000 | - | 1,000 |
| Vinyl Chloride | - | 1,000 | 88 J | 1,000 | 65 J | 1,000 | - | 1,000 |
| o-xylene | 3,300 | 500 | 3,200 | 500 | 3,200 | 500 | 3,000 | 500 |
| m-xylene | 9,800 | 500 | 9,400 | 500 | 9,700 | 500 | 9,000 | 500 |
| p-xylene | - | 500 | - | 500 | - | 500 | - | 500 |

DL Detection Limit
J Estimated Value
- Non Detectable concentrations

2964_217

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 13
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Total PCB and Chloride Analyses - EPA Methods 8082/325.2
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | | | |
|----------------------------------|-------------------------|--------|-------------------------|--------|-------------------------|--------|-------------------------|--------|
| | A Mixtures 013 & 017 | | B Mixtures 014 & 018 | | C Mixtures 015 & 019 | | D Mixtures 016 & 020 | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL PCBs | | | | | | | | |
| Aroclor-1016 | - | 26,000 | - | 25,000 | - | 27,000 | - | 27,000 |
| Aroclor-1221 | - | 26,000 | - | 25,000 | - | 27,000 | - | 27,000 |
| Aroclor-1232 | - | 26,000 | - | 25,000 | - | 27,000 | - | 27,000 |
| Aroclor-1242 | 430,000 | 26,000 | 410,000 | 25,000 | 500,000 | 27,000 | 340,000 | 27,000 |
| Aroclor-1248 | - | 26,000 | - | 25,000 | - | 27,000 | - | 27,000 |
| Aroclor-1254 | - | 26,000 | - | 25,000 | - | 27,000 | - | 27,000 |
| Aroclor-1260 | - | 26,000 | - | 25,000 | - | 27,000 | - | 27,000 |
| II. ADDITIONAL PARAMETERS | | | | | | | | |
| Chloride (mg/kg) | 40,000 | 13,000 | 25,000 | 12,000 | 29,000 | 13,000 | 14,000 | 13,000 |

DL Detection Limit
J Estimated Value
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 14
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of SPLP PCB and Chloride Analyses - EPA Methods 1312/8082
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-------------------------|-------------------------|------|-------------------------|------|-------------------------|------|-------------------------|------|
| | A Mixtures 013 & 017 | | B Mixtures 014 & 018 | | C Mixtures 015 & 019 | | D Mixtures 016 & 020 | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP PCBs | | | | | | | | |
| Aroclor-1016 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1221 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1232 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1242 | 98 | 0.50 | 190 | 0.50 | 100 | 0.50 | 140 | 0.50 |
| Aroclor-1248 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1254 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1260 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |

DL Detection Limit
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 15
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Mixture Development**

| KIBER SAMPLE No. | MATERIAL TYPE | REAGENT TYPE | REAGENT ADDITION (%) (2) | WATER ADDITION (%) (2) |
|---------------------------------------|------------------|---|--------------------------------|------------------------------|
| REAGENT ONLY (1) | | | | |
| 2964-013 | Parent A | Type I Portland Cement | 10 | 8 |
| 2964-014 | Parent B | Type I Portland Cement / Organophillic Clay | 20 / 3 | 16 |
| 2964-015 | Parent C | Type I Portland Cement / Organophillic Clay | 20 / 5 | 25 |
| 2964-016 | Parent D | Type I Portland Cement / Hydrated Lime | 10 / 10 | 20 |
| REAGENT WITH IRON ADDITION (2) | | | | |
| 2964-017 | Parent A | Type I Portland Cement | 10 | 8 |
| 2964-018 | Parent B | Type I Portland Cement / Organophillic Clay | 20 / 3 | 16 |
| 2964-019 | Parent C | Type I Portland Cement / Organophillic Clay | 20 / 5 | 25 |
| 2964-020 | Parent D | Type I Portland Cement / Organophillic Clay | 10 / 10 | 20 |

- (1) Reagents were blended dry, slurried with water and added to the untreated material and blended. Note that these mixtures were blended in a similar manner to those that received iron addition and were allowed to set for 3 days. After three days the treatment reagents were added.
- (2) Iron was added to the untreated aliquot and blended until homogenous. The material was allowed to sit for a period of 3 days at which time treatment reagents were blended dry, slurried with water and added to the untreated material and blended.
- (3) For a mixture with 10% reagent addition and 10% water addition, 20 grams of reagent will be slurried with 20 grams of water and added to 200 grams of untreated material.

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 16
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(21 Day Cure)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|------------------------|-------------------------|
| | 10% Cement | | 20% Cement / 3 % Clay | | 20% Cement / 5 % Clay | | 10% Cement / 10 % Lime | |
| | 2964-013 Reagent | 2964-017 Iron Filing | 2964-014 Reagent | 2964-018 Iron Filing | 2964-015 Reagent | 2964-019 Iron Filing | 2964-016 Reagent | 2964-020 Iron Filing |
| I. TOTAL VOLATILES | | | | | | | | |
| Acetone | 20,000 J | 11,000 J | 13,000 J | 8,700 J | 14,000 J | 11,000 J | 13,000 J | 11,000 J |
| Benzene | 6,300 J | 3,800 J | 6,500 J | 3,300 J | 7,500 J | 4,300 J | 4,000 J | 2,100 J |
| Bromobenzene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Bromochloromethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Bromodichloromethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Bromoform | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Bromomethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 2-butanone | 16,000 J | 9,300 J | 12,000 J | 7,300 J | 13,000 J | 9,000 J | 8,600 J | 6,400 J |
| n-Butylbenzene | 23,000 | 19,000 | 24,000 | 18,000 | 21,000 | 18,000 | 21,000 | 18,000 |
| s-Butylbenzene | 4,500 J | 3,800 J | 4,700 J | 3,500 J | 4,100 J | 3,400 J | 4,100 J | 3,300 J |
| t-Butylbenzene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Carbon disulfide | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Carbon tetrachloride | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Chlorobenzene | 74,000 | 59,000 | 84,000 | 62,000 | 86,000 | 69,000 | 69,000 | 55,000 |
| Chlorodibromomethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Chloroethane | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| 2-Chloroethyl vinyl ether | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| Chloroform | 13,000 | 6,900 J | 13,000 | 5,900 J | 15,000 | 7,300 J | 5,400 J | 2,300 J |
| Chloromethane | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| 2-Chlorotoluene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 4-Chlorotoluene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,2-Dibromo-3-Chloropropane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,2-Dibromoethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Dibromomethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,2-Dichlorobenzene | 110,000 | 91,000 | 130,000 | 97,000 | 130,000 | 110,000 | 120,000 | 96,000 |
| 1,3-Dichlorobenzene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,4-Dichlorobenzene | 2,600 J | 2,400 J | 3,200 J | 2,600 J | 3,100 J | 2,800 J | 2,700 J | 2,500 J |
| Dichlorodifluoromethane | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| 1,1-Dichloroethane | 6,600 J | 3,400 J | 7,300 J | 2,700 J | 10,000 | 4,500 J | 3,600 J | 1,000 J |
| 1,2-Dichloroethane | 10,000 | 4,800 J | 9,200 | 4,600 J | 11,000 | 5,900 J | 4,400 J | 2,500 J |
| 1,1-Dichloroethene | 470 J | < 7,800 | < 8,200 | < 7,900 | 870 J | < 8,200 | < 8,000 | < 8,200 |
| cis-1,2-Dichloroethene | 3,200 J | 1,800 J | 3,600 J | 1,600 J | 4,700 J | 2,400 J | 1,600 J | 590 J |
| trans-1,2-Dichloroethene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,2-Dichloropropane | 3,500 J | 2,300 J | 3,100 J | 1,900 J | 3,100 J | 2,000 J | 1,900 J | 1,100 J |
| 1,3-Dichloropropane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 16
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(21 Day Cure)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|------------------------|-------------------------|
| | 10% Cement | | 20% Cement / 3 % Clay | | 20% Cement / 5 % Clay | | 10% Cement / 10 % Lime | |
| | 2964-013 Reagent | 2964-017 Iron Filing | 2964-014 Reagent | 2964-018 Iron Filing | 2964-015 Reagent | 2964-019 Iron Filing | 2964-016 Reagent | 2964-020 Iron Filing |
| I. TOTAL VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| cis-1,3-Dichloropropene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| trans-1,3-Dichloropropene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,1-Dichloropropene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Ethylbenzene | 320,000 | 270,000 | 410,000 | 260,000 | 320,000 | 270,000 | 290,000 | 240,000 |
| 2-Hexanone | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| Hexachlorobutadiene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Isopropyl benzene | 15,000 | 12,000 | 15,000 | 11,000 | 14,000 | 11,000 | 13,000 | 10,000 |
| p-isopropyltoluene | 5,500 J | 4,800 J | 5,700 J | 4,400 J | 5,000 J | 4,400 J | 5,100 J | 4,300 J |
| 4-Methyl-2-pentanone (MIBK) | 76,000 | 44,000 | 63,000 | 43,000 | 66,000 | 46,000 | 46,000 | 37,000 |
| Methylene chloride | 1,800 J | < 7,800 | 1,800 J | < 7,900 | 2,500 J | < 8,200 | < 8,000 | < 8,200 |
| Naphthalene | 41,000 | 32,000 | 38,000 | 28,000 | 36,000 | 27,000 | 36,000 | 28,000 |
| n-Propyl benzene | 48,000 | 38,000 | 49,000 | 36,000 | 43,000 | 36,000 | 41,000 | 34,000 |
| Styrene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,1,1,2-Tetrachloroethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,1,2,2-Tetrachloroethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Tetrachloroethene | 2,000,000 | 1,400,000 | 2,200,000 | 1,700,000 | 1,800,000 | 1,600,000 | 1,600,000 | 1,400,000 |
| Toluene | 1,600,000 | 1,000,000 | 1,800,000 | 1,400,000 | 1,600,000 | 1,400,000 | 1,300,000 | 1,100,000 |
| 1,2,3-Trichlorobenzene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,2,4-Trichlorobenzene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,1,1-Trichloroethane | 170,000 | 110,000 | 190,000 | 100,000 | 220,000 | 120,000 | 120,000 | 57,000 |
| 1,1,2-Trichloroethane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| Trichloroethene | 1,700,000 | 790,000 | 1,900,000 | 1,200,000 | 1,800,000 | 1,300,000 | 1,100,000 | 860,000 |
| Trichlorofluoromethane | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| 1,2,3-Trichloropropane | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |
| 1,2,4-Trimethylbenzene | 180,000 | 150,000 | 180,000 | 140,000 | 170,000 | 140,000 | 170,000 | 140,000 |
| 1,3,5-Trimethylbenzene | 63,000 | 51,000 | 64,000 | 47,000 | 56,000 | 46,000 | 55,000 | 47,000 |
| Vinyl Acetate | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| Vinyl Chloride | < 16,000 | < 16,000 | < 16,000 | < 16,000 | < 17,000 | < 16,000 | < 16,000 | < 16,000 |
| o-xylene | 400,000 | 310,000 | 450,000 | 370,000 | 380,000 | 350,000 | 370,000 | 320,000 |
| m-xylene | 1,400,000 | 1,100,000 | 1,600,000 | 1,300,000 | 1,300,000 | 1,200,000 | 1,300,000 | 1,100,000 |
| p-xylene | < 8,200 | < 7,800 | < 8,200 | < 7,900 | < 8,400 | < 8,200 | < 8,000 | < 8,200 |

DL Detection Limit
 J Estimated Value
 - Non Detectable concentrations

2964_221

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 17
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(21 Day Cure)

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|------------------------|-------------------------|
| | 10% Cement | | 20% Cement / 3 % Clay | | 20% Cement / 5 % Clay | | 10% Cement / 10 % Lime | |
| | 2964-013 Reagent | 2964-017 Iron Filing | 2964-014 Reagent | 2964-018 Iron Filing | 2964-015 Reagent | 2964-019 Iron Filing | 2964-016 Reagent | 2964-020 Iron Filing |
| I SPLP VOLATILES | | | | | | | | |
| Acetone | 490 J | 680 J | 820 J | 590 J | 810 J | 744 J | 700 J | < 500 |
| Benzene | 91 J | 85 J | 160 J | 86 J | 150 J | 103 J | 120 J | 41 J |
| Bromobenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Bromochloromethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Bromodichloromethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Bromoform | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Bromomethane | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 500 |
| 2-butanone | 280 J | 250 J | 490 J | 310 J | 380 J | 319 J | 340 J | < 1,000 |
| n-Butylbenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| s-Butylbenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| t-Butylbenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Carbon disulfide | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Carbon tetrachloride | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Chlorobenzene | 950 | 890 | 1,100 | 960 | 1,100 | 937 | 1,100 | 910 |
| Chlorodibromomethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Chloroethane | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| 2-Chloroethyl vinyl ether | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| Chloroform | 220 J | 200 J | 440 J | 190 J | 390 J | 220 J | 220 J | 44 J |
| Chloromethane | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| 2-Chlorotoluene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 4-Chlorotoluene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,2-Dibromo-3-Chloropropane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,2-Dibromoethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Dibromomethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,2-Dichlorobenzene | 450 J | 430 J | 410 J | 380 J | 390 J | 356 J | 510 | 530 J |
| 1,3-Dichlorobenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,4-Dichlorobenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Dichlorodifluoromethane | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| 1,1-Dichloroethane | 75 J | 83 J | 240 J | 77 J | 240 J | 118 J | 150 J | < 500 |
| 1,2-Dichloroethane | 220 J | 190 J | 420 J | 210 J | 400 J | 265 J | 220 J | 72 J |
| 1,1-Dichloroethene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| ois-1,2-Dichloroethene | 32 J | 39 J | 92 J | 41 J | 100 J | 56.1 J | 51 J | < 500 |
| trans-1,2-Dichloroethene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,2-Dichloropropane | 67 J | 57 J | 87 J | 54 J | 71 J | 50.2 J | 58 J | 26 J |
| 1,3-Dichloropropane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 17
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(21 Day Cure)

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-----------------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|------------------------|-------------------------|
| | 10% Cement | | 20% Cement / 3 % Clay | | 20% Cement / 5 % Clay | | 10% Cement / 10 % Lime | |
| | 2964-013 Reagent | 2964-017 Iron Filing | 2964-014 Reagent | 2964-018 Iron Filing | 2964-015 Reagent | 2964-019 Iron Filing | 2964-016 Reagent | 2964-020 Iron Filing |
| I. SPLP VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| cis-1,3-Dichloropropene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| trans-1,3-Dichloropropene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,1-Dichloropropene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Ethylbenzene | 2,300 | 2,100 | 2,400 | 2,200 | 2,300 | 2,260 | 2,500 | 2,100 |
| 2-Hexanone | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| Hexachlorobutadiene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Isopropyl benzene | 38 J | 32 J | 37 J | 31 J | 33 J | 34.6 J | 38 J | 38 J |
| p-isopropyltoluene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 4-Methyl-2-pentanone (MIBK) | 1,700 | 1,500 | 2,600 | 1,800 | 2,300 | 1,610 | 1,700 | 1,100 |
| Methylene chloride | < 500 | < 500 | 61 J | < 500 | < 500 | < 500 | < 500 | < 500 |
| Naphthalene | 140 J | 110 J | 91 J | 80 J | 77 J | 71.4 J | 110 J | 140 J |
| n-Propyl benzene | 84 J | 71 J | 81 J | 64 J | 69 J | 73.1 J | 80 J | 81 J |
| Styrene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,1,1,2-Tetrachloroethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,1,2,2-Tetrachloroethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Tetrachloroethene | 9,600 | 8,700 | 11,000 | 8,900 | 9,200 | 9,270 | 9,900 | 7,800 |
| Toluene | 19,000 | 17,000 | 31,000 | 18,000 | 27,000 | 18,600 | 29,000 | 14,000 |
| 1,2,3-Trichlorobenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,2,4-Trichlorobenzene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,1,1-Trichloroethane | 2,100 | 1,900 | 4,000 | 2,000 | 3,800 | 2,440 | 3,100 | 800 |
| 1,1,2-Trichloroethane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| Trichloroethene | 19,000 | 17,000 | 35,000 | 18,000 | 32,000 | 23,900 | 30,000 | 11,000 |
| Trichlorofluoromethane | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| 1,2,3-Trichloropropane | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| 1,2,4-Trimethylbenzene | 450 J | 430 J | 430 J | 380 J | 390 J | 400 J | 440 J | 450 J |
| 1,3,5-Trimethylbenzene | 130 J | 120 J | 120 J | 110 J | 110 J | 122 J | 120 J | 130 J |
| Vinyl Acetate | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| Vinyl Chloride | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 | < 1,000 |
| o-xylene | 2,900 | 2,700 | 2,900 | 2,700 | 2,800 | 2,720 | 3,000 | 2,700 |
| m-xylene | 8,400 | 7,900 | 8,800 | 8,000 | 8,300 | 8,190 | 9,000 | 7,900 |
| p-xylene | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |

- DL Detection Limit
- J Estimated Value
- Non Detectable concentrations

2964_222

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 18
Phase III: Intermediate Tests - Zero Valent Iron Addition
Summary of Total PCB and Chloride Analyses - EPA Methods 8082/325.2
(21 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) (1) | | | | | | | |
|----------------------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|------------------------|-------------------------|
| | 10% Cement | | 20% Cement / 3 % Clay | | 20% Cement / 5 % Clay | | 10% Cement / 10 % Lime | |
| | 2964-013 Reagent | 2964-017 Iron Filing | 2964-014 Reagent | 2964-018 Iron Filing | 2964-015 Reagent | 2964-019 Iron Filing | 2964-016 Reagent | 2964-020 Iron Filing |
| I. TOTAL PCBs | | | | | | | | |
| Aroclor-1016 | < 43,000 | < 41,000 | < 43,000 | < 42,000 | < 45,000 | < 42,000 | < 46,000 | < 43,000 |
| Aroclor-1221 | < 43,000 | < 41,000 | < 43,000 | < 42,000 | < 45,000 | < 42,000 | < 46,000 | < 43,000 |
| Aroclor-1232 | < 43,000 | < 41,000 | < 43,000 | < 42,000 | < 45,000 | < 42,000 | < 46,000 | < 43,000 |
| Aroclor-1242 | 440,000 | 350,000 | 560,000 | 450,000 | 430,000 | 460,000 | 520,000 | 540,000 |
| Aroclor-1248 | < 43,000 | < 41,000 | < 43,000 | < 42,000 | < 45,000 | < 42,000 | < 46,000 | < 43,000 |
| Aroclor-1254 | < 43,000 | < 41,000 | < 43,000 | < 42,000 | < 45,000 | < 42,000 | < 46,000 | < 43,000 |
| Aroclor-1260 | < 43,000 | < 41,000 | < 43,000 | < 42,000 | < 45,000 | < 42,000 | < 46,000 | < 43,000 |
| II. ADDITIONAL PARAMETERS | | | | | | | | |
| Chloride (mg/kg) | 5,400 | 3,400 | 4,700 | 3,900 | 7,100 | 4,700 | 7,100 | 7,000 |

DL Detection Limit
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 19
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of SPLP PCB Analyses - EPA Methods 1312/8082
(21 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) (1) | | | | | | | |
|-------------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|------------------------|-------------------------|
| | 10% Cement | | 20% Cement / 3 % Clay | | 20% Cement / 5 % Clay | | 10% Cement / 10 % Lime | |
| | 2964-013 Reagent | 2964-017 Iron Filing | 2964-014 Reagent | 2964-018 Iron Filing | 2964-015 Reagent | 2964-019 Iron Filing | 2964-016 Reagent | 2964-020 Iron Filing |
| I. SPLP PCBs | | | | | | | | |
| Aroclor-1016 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aroclor-1221 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aroclor-1232 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aroclor-1242 | 15 | 2.2 | 19 | 0.97 | 4.9 | 2.4 | 2.7 | 2.1 |
| Aroclor-1248 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aroclor-1254 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aroclor-1260 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |

DL Detection Limit
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 20
Phase III: Intermediate Tests - Zero Valent Iron Amendment
Summary of Unconfined Compressive Strength Testing - ASTM D 2166
(21 Day Cure)**

| KIBER SAMPLE No. | MATERIAL TYPE | REAGENT TYPE | REAGENT ADDITION (%) (3) | WATER ADDITION (%) (3) | UNCONFINED COMPRESSIVE STRENGTH TESTING (UCS) (4) | | | |
|---------------------------|------------------|---|--------------------------------|------------------------------|---|---|--|-------------------------------|
| | | | | | Moisture Content (%) | Bulk Density (lbs/ft ³) | Dry Density (lbs/ft ³) | UCS (lbs/in ²) |
| REAGENT ADDITION ONLY (1) | | | | | | | | |
| 2964-013 | Parent A | Type I Portland Cement | 10 | 8 | 28 | 101 | 79 | 27 |
| 2964-014 | Parent B | Type I Portland Cement / Organophillic Clay | 20 / 3 | 16 | 28 | 99 | 78 | 32 |
| 2964-015 | Parent C | Type I Portland Cement / Organophillic Clay | 20 / 5 | 25 | 48 | 95 | 64 | 23 |
| 2964-016 | Parent D | Type I Portland Cement / Hydrated Lime | 10 / 10 | 20 | 42 | 96 | 98 | 39 |
| IRON FILING ADDITION (2) | | | | | | | | |
| 2964-017 | Parent A | Type I Portland Cement | 10 | 8 | 29 | 104 | 81 | 38 |
| 2964-018 | Parent B | Type I Portland Cement / Organophillic Clay | 20 / 3 | 16 | 25 | 105 | 84 | 49 |
| 2964-019 | Parent C | Type I Portland Cement / Organophillic Clay | 20 / 5 | 25 | 29 | 104 | 80 | 38 |
| 2964-020 | Parent D | Type I Portland Cement / Hydrated Lime | 10 / 10 | 20 | 35 | 98 | 73 | 38 |

- (1) Reagents were blended dry, slurried with water and added to the untreated material and blended. Note that these mixtures were blended in a similar manner to those that received iron addition and were allowed to set for 3 days. After three days the treatment reagents were added.
- (2) Iron was added to the untreated aliquot and blended until homogenous. The material was allowed to sit for a period of 3 days at which time treatment reagents were blended dry, slurried with water and added to the untreated material and blended.
- (3) For a mixture with 10% reagent addition and 10% water addition, 20 grams of reagent will be slurried with 20 grams of water and added to 200 grams of untreated material.
- (4) Unconfined compressive strength testing was performed after 21 days of curing.

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 21
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Parent Material)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | |
|-----------------------------|--------------------|-----------|--------------------|------------|
| | A | | B | |
| | Mixtures 021 & 023 | | Mixtures 022 & 024 | |
| | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | |
| Acetone | 140,000 J | 1,500,000 | - | 16,000,000 |
| Benzene | 27,000 J | 77,000 | - | 810,000 |
| Bromobenzene | - | 77,000 | - | 810,000 |
| Bromochloromethane | - | 77,000 | - | 810,000 |
| Bromodichloromethane | - | 77,000 | - | 810,000 |
| Bromoform | - | 77,000 | - | 810,000 |
| Bromomethane | - | 150,000 | - | 1,600,000 |
| 2-butanone | 130,000 J | 1,500,000 | - | 16,000,000 |
| n-Butylbenzene | 32,000 J | 77,000 | - | 810,000 |
| s-Butylbenzene | 7,300 J | 77,000 | - | 810,000 |
| t-Butylbenzene | - | 77,000 | - | 810,000 |
| Carbon disulfide | - | 77,000 | - | 810,000 |
| Carbon tetrachloride | - | 77,000 | - | 810,000 |
| Chlorobenzene | 170,000 | 77,000 | 280,000 J | 810,000 |
| Chlorodibromomethane | - | 77,000 | - | 810,000 |
| Chloroethane | - | 150,000 | - | 1,600,000 |
| 2-Chloroethyl vinyl ether | - | 150,000 | - | 1,600,000 |
| Chloroform | 69,000 J | 77,000 | 120,000 J | 810,000 |
| Chloromethane | - | 150,000 | - | 1,600,000 |
| 2-Chlorotoluene | - | 77,000 | - | 810,000 |
| 4-Chlorotoluene | - | 77,000 | - | 810,000 |
| 1,2-Dibromo-3-Chloropropane | - | 77,000 | - | 810,000 |
| 1,2-Dibromoethane | - | 77,000 | - | 810,000 |
| Dibromomethane | - | 77,000 | - | 810,000 |
| 1,2-Dichlorobenzene | 190,000 | 77,000 | 340,000 J | 810,000 |
| 1,3-Dichlorobenzene | - | 77,000 | - | 810,000 |
| 1,4-Dichlorobenzene | - | 77,000 | - | 810,000 |
| Dichlorodifluoromethane | - | 150,000 | - | 1,600,000 |
| 1,1-Dichloroethane | 67,000 J | 77,000 | 110,000 J | 810,000 |
| 1,2-Dichloroethane | 69,000 J | 77,000 | 130,000 J | 810,000 |
| 1,1-Dichloroethene | - | 77,000 | - | 810,000 |
| cis-1,2-Dichloroethene | 21,000 J | 77,000 | - | 810,000 |
| trans-1,2-Dichloroethene | - | 77,000 | - | 810,000 |
| 1,2-Dichloropropane | - | 77,000 | - | 810,000 |
| 1,3-Dichloropropane | - | 77,000 | - | 810,000 |

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 21
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | |
|-----------------------------|--------------------|---------|--------------------|-----------|
| | A | | B | |
| | Mixtures 021 & 023 | | Mixtures 022 & 024 | |
| | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | |
| 2,2-Dichloropropane | - | 77,000 | - | 810,000 |
| cis-1,3-Dichloropropene | - | 77,000 | - | 810,000 |
| trans-1,3-Dichloropropene | - | 77,000 | - | 810,000 |
| 1,1-Dichloropropene | - | 77,000 | - | 810,000 |
| Ethylbenzene | 630,000 | 77,000 | 980,000 | 810,000 |
| 2-Hexanone | - | 150,000 | - | 1,600,000 |
| Hexachlorobutadiene | - | 77,000 | - | 810,000 |
| Isopropyl benzene | 25,000 J | 77,000 | - | 810,000 |
| p-isopropyltoluene | 8,600 J | 77,000 | - | 810,000 |
| 4-Methyl-2-pentanone (MIBK) | 210,000 | 150,000 | - | 1,600,000 |
| Methylene chloride | 100,000 | 77,000 | 160,000 J | 810,000 |
| Naphthalene | 61,000 J | 150,000 | - | 1,600,000 |
| n-Propyl benzene | 67,000 J | 77,000 | 94,000 J | 810,000 |
| Styrene | - | 77,000 | - | 810,000 |
| 1,1,1,2-Tetrachloroethane | - | 77,000 | - | 810,000 |
| 1,1,2,2-Tetrachloroethane | - | 77,000 | - | 810,000 |
| Tetrachloroethene | 5,200,000 | 77,000 | 6,300,000 | 810,000 |
| Toluene | 5,200,000 | 77,000 | 6,800,000 | 810,000 |
| 1,2,3-Trichlorobenzene | - | 77,000 | - | 810,000 |
| 1,2,4-Trichlorobenzene | - | 77,000 | - | 810,000 |
| 1,1,1-Trichloroethane | 830,000 | 77,000 | 1,400,000 | 810,000 |
| 1,1,2-Trichloroethane | - | 77,000 | - | 810,000 |
| Trichloroethene | 6,900,000 | 77,000 | 9,100,000 | 810,000 |
| Trichlorofluoromethane | - | 150,000 | - | 1,600,000 |
| 1,2,3-Trichloropropane | - | 77,000 | - | 810,000 |
| 1,2,4-Trimethylbenzene | 270,000 | 77,000 | 390,000 J | 810,000 |
| 1,3,5-Trimethylbenzene | 94,000 | 77,000 | 130,000 J | 810,000 |
| Vinyl Acetate | - | 150,000 | - | 1,600,000 |
| Vinyl Chloride | - | 150,000 | - | 1,600,000 |
| o-xylene | 660,000 | 77,000 | 1,000,000 | 810,000 |
| m-xylene | 2,400,000 | 77,000 | 4,000,000 | 810,000 |
| p-xylene | - | 77,000 | - | 810,000 |

DL Detection Limit
J Estimated Value
- Non Detectable concentrations

2964_225

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 22
Phase IV: Verification Testing
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(Parent Material)

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | |
|-----------------------------|--------------------|---------|--------------------|---------|
| | A | | B | |
| | Mixtures 021 & 023 | | Mixtures 022 & 024 | |
| | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | |
| Acetone | 9,200 J | 100,000 | 9,600 J | 100,000 |
| Benzene | 740 J | 5,000 | 860 J | 5,000 |
| Bromobenzene | - | 5,000 | - | 5,000 |
| Bromochloromethane | - | 5,000 | - | 5,000 |
| Bromodichloromethane | - | 5,000 | - | 5,000 |
| Bromoform | - | 5,000 | - | 5,000 |
| Bromomethane | 520 J | 10,000 | - | 10,000 |
| 2-butanone | 8,600 J | 100,000 | 8,900 J | 100,000 |
| n-Butylbenzene | - | 5,000 | - | 5,000 |
| s-Butylbenzene | - | 5,000 | - | 5,000 |
| t-Butylbenzene | - | 5,000 | - | 5,000 |
| Carbon disulfide | - | 5,000 | - | 5,000 |
| Carbon tetrachloride | - | 5,000 | - | 5,000 |
| Chlorobenzene | 1,600 J | 5,000 | 2,900 J | 5,000 |
| Chlorodibromomethane | - | 5,000 | - | 5,000 |
| Chloroethane | - | 10,000 | - | 10,000 |
| 2-Chloroethyl vinyl ether | - | 10,000 | - | 10,000 |
| Chloroform | 2,500 J | 5,000 | 3,200 J | 5,000 |
| Chloromethane | - | 10,000 | - | 10,000 |
| 2-Chlorotoluene | - | 5,000 | - | 5,000 |
| 4-Chlorotoluene | - | 5,000 | - | 5,000 |
| 1,2-Dibromo-3-Chloropropane | - | 5,000 | - | 5,000 |
| 1,2-Dibromoethane | - | 5,000 | - | 5,000 |
| Dibromomethane | - | 5,000 | - | 5,000 |
| 1,2-Dichlorobenzene | 530 J | 5,000 | 2,400 J | 5,000 |
| 1,3-Dichlorobenzene | - | 5,000 | - | 5,000 |
| 1,4-Dichlorobenzene | - | 5,000 | - | 5,000 |
| Dichlorodifluoromethane | - | 10,000 | - | 10,000 |
| 1,1-Dichloroethane | 2,400 J | 5,000 | 2,900 J | 5,000 |
| 1,2-Dichloroethane | 3,400 J | 5,000 | 4,000 J | 5,000 |
| 1,1-Dichloroethene | - | 5,000 | - | 5,000 |
| cis-1,2-Dichloroethene | 780 J | 5,000 | 960 J | 5,000 |
| trans-1,2-Dichloroethene | - | 5,000 | - | 5,000 |
| 1,2-Dichloropropane | 240 J | 5,000 | 350 J | 5,000 |
| 1,3-Dichloropropane | - | 5,000 | - | 5,000 |

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 22
Phase IV: Verification Testing
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | |
|-----------------------------|-------------------------|--------|-------------------------|--------|
| | A Mixtures 021 & 023 | | B Mixtures 022 & 024 | |
| | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | |
| 2,2-Dichloropropane | - | 5,000 | - | 5,000 |
| cis-1,3-Dichloropropene | - | 5,000 | - | 5,000 |
| trans-1,3-Dichloropropene | - | 5,000 | - | 5,000 |
| 1,1-Dichloropropene | - | 5,000 | - | 5,000 |
| Ethylbenzene | 2,800 J | 5,000 | 8,700 | 5,000 |
| 2-Hexanone | - | 10,000 | - | 10,000 |
| Hexachlorobutadiene | - | 5,000 | - | 5,000 |
| Isopropyl benzene | - | 5,000 | 260 J | 5,000 |
| p-isopropyltoluene | - | 5,000 | - | 5,000 |
| 4-Methyl-2-pentanone (MIBK) | 15,000 | 10,000 | 14,000 | 10,000 |
| Methylene chloride | 5,400 | 5,000 | 6,000 | 5,000 |
| Naphthalene | 820 J | 10,000 | 720 J | 10,000 |
| n-Propyl benzene | - | 5,000 | 690 J | 5,000 |
| Styrene | - | 5,000 | - | 5,000 |
| 1,1,1,2-Tetrachloroethane | - | 5,000 | - | 5,000 |
| 1,1,2,2-Tetrachloroethane | - | 5,000 | - | 5,000 |
| Tetrachloroethene | 15,000 | 5,000 | 55,000 | 5,000 |
| Toluene | 49,000 | 5,000 | 79,000 | 5,000 |
| 1,2,3-Trichlorobenzene | 340 J | 5,000 | - | 5,000 |
| 1,2,4-Trichlorobenzene | - | 5,000 | - | 5,000 |
| 1,1,1-Trichloroethane | 12,000 | 5,000 | 21,000 | 5,000 |
| 1,1,2-Trichloroethane | - | 5,000 | - | 5,000 |
| Trichloroethene | 87,000 | 5,000 | 130,000 | 5,000 |
| Trichlorofluoromethane | - | 10,000 | - | 10,000 |
| 1,2,3-Trichloropropane | - | 5,000 | - | 5,000 |
| 1,2,4-Trimethylbenzene | 560 J | 5,000 | 3,000 J | 5,000 |
| 1,3,5-Trimethylbenzene | - | 5,000 | 1,000 J | 5,000 |
| Vinyl Acetate | - | 10,000 | - | 10,000 |
| Vinyl Chloride | - | 10,000 | - | 10,000 |
| o-xylene | 3,300 J | 5,000 | 9,800 | 5,000 |
| m-xylene | 11,000 | 5,000 | 35,000 | 5,000 |
| p-xylene | - | 5,000 | - | 5,000 |

DL Detection Limit
J Estimated Value
- Non Detectable concentrations

2964_232

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 23
Phase IV: Verification Testing
Summary of Total Pesticide / PCB Analyses - EPA Method 8081/8082
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | |
|----------------------------|-------------------------|--------|-------------------------|--------|
| | A Mixtures 021 & 023 | | B Mixtures 022 & 024 | |
| | Conc. | DL | Conc. | DL |
| I. TOTAL PESTICIDES | | | | |
| alpha-BHC | - | 13 | - | 13 |
| beta-BHC | - | 13 | - | 13 |
| delta-BHC | - | 13 | - | 13 |
| Heptachlor | - | 13 | - | 13 |
| Aldrin | - | 13 | - | 13 |
| Heptachlor epoxide | - | 13 | - | 13 |
| Endosulfan I | - | 13 | - | 13 |
| Dieldrin | - | 27 | - | 26 |
| 4,4'-DDE | - | 27 | - | 26 |
| Endrin | - | 27 | - | 26 |
| Endosulfan II | - | 27 | - | 26 |
| 4,4'-DDD | - | 27 | - | 26 |
| Endosulfan Sulfate | - | 27 | - | 26 |
| 4,4'-DDT | - | 27 | - | 26 |
| Methoxychlor | - | 130 | - | 130 |
| Endrin Ketone | - | 27 | - | 26 |
| Endrin aldehyde | - | 27 | - | 26 |
| alpha-Chlordane | - | 13 | - | 13 |
| gamma-Chlordane | - | 13 | - | 13 |
| Toxaphene | - | 270 | - | 260 |
| gamma-BHC (Lindane) | - | 13 | - | 13 |
| II. TOTAL PCBs | | | | |
| Aroclor-1016 | - | 25,000 | - | 27,000 |
| Aroclor-1221 | - | 25,000 | - | 27,000 |
| Aroclor-1232 | - | 25,000 | - | 27,000 |
| Aroclor-1242 | 580,000 | 25,000 | 600,000 | 27,000 |
| Aroclor-1248 | - | 25,000 | - | 27,000 |
| Aroclor-1254 | - | 25,000 | - | 27,000 |
| Aroclor-1260 | - | 25,000 | - | 27,000 |

DL Detection Limit
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 24
Phase IV: Verification Testing
Summary of SPLP Pesticide / PCB Analyses - EPA Methods 1312/8081/8082
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | |
|---------------------------|-------------------------|-------|-------------------------|-------|
| | A Mixtures 021 & 023 | | B Mixtures 022 & 024 | |
| | Conc. | DL | Conc. | DL |
| I. SPLP PESTICIDES | | | | |
| alpha-BHC | - | 0.055 | - | 0.055 |
| beta-BHC | - | 0.055 | - | 0.055 |
| delta-BHC | - | 0.055 | - | 0.055 |
| Heptachlor | - | 0.055 | - | 0.055 |
| Aldrin | - | 0.055 | - | 0.055 |
| Heptachlor epoxide | - | 0.055 | - | 0.055 |
| Endosulfan I | - | 0.055 | - | 0.055 |
| Dieldrin | - | 0.11 | - | 0.11 |
| 4,4'-DDE | - | 0.11 | - | 0.11 |
| Endrin | - | 0.11 | - | 0.11 |
| Endosulfan II | - | 0.11 | - | 0.11 |
| 4,4'-DDD | - | 0.11 | - | 0.11 |
| Endosulfan Sulfate | - | 0.11 | - | 0.11 |
| 4,4'-DDT | - | 0.11 | - | 0.11 |
| Methoxychlor | - | 0.55 | - | 0.55 |
| Endrin Ketone | - | 0.11 | - | 0.11 |
| Endrin aldehyde | - | 0.11 | - | 0.11 |
| alpha-Chlordane | - | 0.055 | - | 0.055 |
| gamma-Chlordane | - | 0.055 | - | 0.055 |
| Toxaphene | - | 1.1 | - | 1.1 |
| gamma-BHC (Lindane) | - | 0.055 | - | 0.055 |
| II. SPLP PCBs | | | | |
| Aroclor-1016 | - | 10 | - | 10 |
| Aroclor-1221 | - | 10 | - | 10 |
| Aroclor-1232 | - | 10 | - | 10 |
| Aroclor-1242 | 58 | 10 | 51 | 10 |
| Aroclor-1248 | - | 10 | - | 10 |
| Aroclor-1254 | - | 10 | - | 10 |
| Aroclor-1260 | - | 10 | - | 10 |

DL Detection Limit
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 25
Phase IV: Verification Testing
Summary of TAL Metals Analyses - EPA Methods 6010B / 7471 / 325.2
(Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (mg/kg) | |
|--------------------------------|-------------------------|-------------------------|
| | A Mixtures 021 & 023 | B Mixtures 022 & 024 |
| I. TOTAL TAL METALS | | |
| Aluminum | 12,000 | 10,000 |
| Antimony | 5.6 | 4.1 |
| Arsenic | 12 | 11 |
| Barium | 630 | 580 |
| Beryllium | < 0.81 | < 0.78 |
| Cadmium | 30 | 29 |
| Calcium | 28,000 | 46,000 |
| Chromium | 210 | 230 |
| Cobalt | < 1.6 | 1.8 |
| Copper | 4,800 | 5,300 |
| Iron | 21,000 | 19,000 |
| Lead | 810 | 750 |
| Magnesium | 3,900 | 4,600 |
| Manganese | 270 | 390 |
| Mercury | 20 | 8.8 J |
| Nickel | 20 | 39 |
| Potassium | 1,100 | 1,100 |
| Selenium | 60 | 52 |
| Silver | 4.3 | 4.1 |
| Sodium | 17,000 | 15,000 |
| Thallium | < 3.2 | < 3.1 |
| Vanadium | 34 | 29 |
| Zinc | 2,600 | 2,000 |
| II. ADDITIONAL ANALYSES | | |
| Total Chloride | 9,400 | 10,000 |

- Non Detectable Concentrations

J Estimated Value

**KIBER ENVIRONMENTAL SERVICES, INC.
 GOLDER ASSOCIATES, INC.
 216 PATERSON PLANK ROAD SITE**

**TABLE 26
 Phase IV: Verification Testing
 Summary of SPLP TAL Metals Analyses - EPA Methods 1312/6010B/7470/325.2
 (Parent Material)**

| ANALYTICAL PARAMETER | RESULTS (mg/L) | |
|--------------------------|-------------------------|-------------------------|
| | A Mixtures 021 & 023 | B Mixtures 022 & 024 |
| I SPLP TAL METALS | | |
| Aluminum | 8.4 | 27 |
| Antimony | 0.022 | 0.03 |
| Arsenic | 0.027 | 0.055 |
| Barium | 0.25 | 0.38 |
| Beryllium | < 0.01 | < 0.01 |
| Cadmium | 0.021 | 0.044 |
| Calcium | 31 | 50 |
| Chromium | 0.28 | 0.49 |
| Cobalt | < 0.02 | < 0.02 |
| Copper | 4.4 | 10 |
| Iron | 13 | 26 |
| Lead | 0.94 | 1.6 |
| Magnesium | 3.4 | 7.2 |
| Manganese | 0.16 | 0.33 |
| Mercury | 0.016 | 0.022 |
| Nickel | 0.04 | 0.057 |
| Potassium | 3.2 | 6.7 |
| Selenium | < 0.01 | < 0.01 |
| Silver | < 0.01 | < 0.01 |
| Sodium | 480 | 480 |
| Thallium | 0.011 | < 0.01 |
| Vanadium | 0.061 | 0.099 |
| Zinc | 2.9 | 4.7 |

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 27
Phase IV: Verification Testing
Summary of Mixture Development**

| KIBER SAMPLE No. | MATERIAL TYPE | REAGENT TYPE (1) | REAGENT ADDITION (%) (3) | WATER ADDITION (%) (3) |
|--|------------------|--|--------------------------------|------------------------------|
| AIR STRIPPING (2) | | | | |
| 2964-021 | Parent A | Type I Portland Cement | 10 | 5 |
| 2964-022 | Parent B | Type I Portland Cement / Hydrated Lime | 10 / 10 | 17 |
| AIR STRIPPING AND IRON ADDITION (3) | | | | |
| 2964-023 | Parent A | Type I Portland Cement | 20 / 5 | 4.5 |
| 2964-024 | Parent B | Type I Portland Cement / Hydrated Lime | 10 / 10 | 15 |

- (1) Reagents were blended dry, slurried with water and added to the specified material and blended.
- (2) These mixtures were developed with material that was air stripped for 120 minutes. After air stripping and iron addition for mixtures 022 and 024, the mixtures were allowed to set for 3 days at which time the stabilization reagents were added. After addition of the stabilization reagents, the materials were allowed to cure for a period of 28 days.
- (3) For a mixture with 10% reagent addition and 10% water addition, 20 grams of reagent will be slurried with 20 grams of water and added to 200 grams of untreated m
- (4) Unconfined compressive strength and volumetric expansion testing were performed after 28 days of curing.

2964_244

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 28
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(After Air Stripping / Iron Addition and 3 Days of Curing)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|-------------------------------|---------|---------------------------|-----------|--------------------------------|-----------|---------------------------|-----------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | | | |
| Acetone | - | 150,000 | - | 1,400,000 | - | 1,500,000 | - | 1,400,000 |
| Benzene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Bromobenzene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Bromochloromethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Bromodichloromethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Bromoform | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Bromomethane | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| 2-butanone | 5,600 J | 150,000 | 13,000 J | 1,400,000 | 17,000 J | 1,500,000 | 12,000 J | 1,400,000 |
| n-Butylbenzene | 17,000 | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| s-Butylbenzene | 3,200 J | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| t-Butylbenzene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Carbon disulfide | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Carbon tetrachloride | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Chlorobenzene | 24,000 | 7,500 | 22,000 J | 71,000 | 44,000 J | 75,000 | 23,000 J | 71,000 |
| Chlorodibromomethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Chloroethane | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| 2-Chloroethyl vinyl ether | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| Chloroform | 890 J | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Chloromethane | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| 2-Chlorotoluene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 4-Chlorotoluene | 390 J | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2-Dibromo-3-Chloropropane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2-Dibromochthane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Dibromomethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2-Dichlorobenzene | 120,000 | 7,500 | 74,000 | 71,000 | 120,000 | 75,000 | 89,000 | 71,000 |
| 1,3-Dichlorobenzene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,4-Dichlorobenzene | 2,300 J | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Dichlorodifluoromethane | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| 1,1-Dichloroethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2-Dichloroethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,1-Dichloroethene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| cis-1,2-Dichloroethene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| trans-1,2-Dichloroethene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2-Dichloropropane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,3-Dichloropropane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 28
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(After Air Stripping / Iron Addition and 3 Days of Curing)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|-------------------------------|--------|---------------------------|---------|--------------------------------|---------|---------------------------|---------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| cis-1,3-Dichloropropene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| trans-1,3-Dichloropropene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,1-Dichloropropene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Ethylbenzene | 110,000 | 7,500 | 100,000 | 71,000 | 190,000 | 75,000 | 100,000 | 71,000 |
| 2-Hexanone | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| Hexachlorobutadiene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Isopropyl benzene | 7,400 J | 7,500 | 6,000 J | 71,000 | 10,000 J | 75,000 | 5,700 J | 71,000 |
| p-isopropyltoluene | 4,600 J | 7,500 | 3,500 J | 71,000 | 4,600 J | 75,000 | - | 71,000 |
| 4-Methyl-2-pentanone (MIBK) | 9,500 J | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| Methylene chloride | 1,200 J | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Naphthalene | 46,000 | 7,500 | 39,000 J | 71,000 | 51,000 J | 75,000 | 34,000 J | 71,000 |
| n-Propyl benzene | 25,000 | 7,500 | 19,000 J | 71,000 | 31,000 J | 75,000 | 19,000 J | 71,000 |
| Styrene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,1,1,2-Tetrachloroethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,1,2,2-Tetrachloroethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Tetrachloroethene | 430,000 | 7,500 | 520,000 | 71,000 | 980,000 | 75,000 | 480,000 | 71,000 |
| Toluene | 220,000 | 7,500 | 310,000 | 71,000 | 620,000 | 75,000 | 320,000 | 71,000 |
| 1,2,3-Trichlorobenzene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2,4-Trichlorobenzene | 3,700 J | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,1,1-Trichloroethane | 14,000 | 7,500 | 27,000 J | 71,000 | 49,000 J | 75,000 | 30,000 J | 71,000 |
| 1,1,2-Trichloroethane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| Trichloroethene | 150,000 | 7,500 | 270,000 | 71,000 | 510,000 | 75,000 | 290,000 | 71,000 |
| Trichlorofluoromethane | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| 1,2,3-Trichloropropane | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |
| 1,2,4-Trimethylbenzene | 130,000 | 7,500 | 100,000 | 71,000 | 160,000 | 75,000 | 100,000 | 71,000 |
| 1,3,5-Trimethylbenzene | 42,000 | 7,500 | 33,000 J | 71,000 | 48,000 J | 75,000 | 33,000 J | 71,000 |
| Vinyl Acetate | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| Vinyl Chloride | - | 15,000 | - | 140,000 | - | 150,000 | - | 140,000 |
| o-xylene | 160,000 | 7,500 | 140,000 | 71,000 | 270,000 | 75,000 | 150,000 | 71,000 |
| m-xylene | 430,000 | 7,500 | 470,000 | 71,000 | 850,000 | 75,000 | 470,000 | 71,000 |
| p-xylene | - | 7,500 | - | 71,000 | - | 75,000 | - | 71,000 |

DL Detection Limit
 J Estimated Value
 - Non Detectable concentrations

2964_230

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 29
Phase IV: Verification Testing
Summary of Total PCB Analyses - EPA Method 8082/325.2
(After Air Stripping / Iron Addition and 3 Days of Curing)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|--------------------------------|-------------------------------|---------|---------------------------|---------|--------------------------------|---------|---------------------------|---------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL PCBs | | | | | | | | |
| Aroclor-1016 | - | 250,000 | - | 240,000 | - | 250,000 | - | 240,000 |
| Aroclor-1221 | - | 250,000 | - | 240,000 | - | 250,000 | - | 240,000 |
| Aroclor-1232 | - | 250,000 | - | 240,000 | - | 250,000 | - | 240,000 |
| Aroclor-1242 | 690,000 | 250,000 | 1,700,000 | 240,000 | 1,200,000 | 250,000 | 1,200,000 | 240,000 |
| Aroclor-1248 | - | 250,000 | - | 240,000 | - | 250,000 | - | 240,000 |
| Aroclor-1254 | - | 250,000 | - | 240,000 | - | 250,000 | - | 240,000 |
| Aroclor-1260 | - | 250,000 | - | 240,000 | - | 250,000 | - | 240,000 |
| II. ADDITIONAL ANALYSES | | | | | | | | |
| Total Chloride (mg/kg) | 7,400 | 1,200 | 5,800 | 1,100 | 7,700 | 1,200 | 6,100 | 1,100 |

DL Detection Limit

- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 30
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(28 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|-------------------------------|---------|---------------------------|---------|--------------------------------|---------|---------------------------|---------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | | | |
| Acetone | - | 170,000 | 12,000 J | 160,000 | 11,000 J | 170,000 | 9,200 J | 160,000 |
| Benzene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Bromobenzene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Bromochloromethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Bromodichloromethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Bromoform | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Bromomethane | - | 17,000 | - | 16,000 | - | 17,000 | - | 8,000 |
| 2-butanone | - | 170,000 | - | 160,000 | - | 170,000 | - | 16,000 |
| n-Butylbenzene | 10,000 | 8,300 | 8,300 J | 160,000 | 7,100 J | 170,000 | 6,500 J | 160,000 |
| s-Butylbenzene | 1,700 J | 8,300 | 12,000 | 7,900 | 10,000 | 8,600 | 7,900 J | 8,000 |
| t-Butylbenzene | - | 8,300 | 2,200 J | 7,900 | 1,900 J | 8,600 | 1,400 J | 8,000 |
| Carbon disulfide | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Carbon tetrachloride | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Chlorobenzene | 7,600 J | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Chlorodibromomethane | - | 8,300 | 16,000 | 7,900 | 13,000 | 8,600 | 8,100 | 8,000 |
| Chloroethane | - | 17,000 | - | 16,000 | - | 17,000 | - | 8,000 |
| 2-Chloroethyl vinyl ether | - | 17,000 | - | 16,000 | - | 17,000 | - | 16,000 |
| Chloroform | - | 8,300 | - | 7,900 | - | 8,600 | - | 16,000 |
| Chloromethane | - | 17,000 | - | 16,000 | - | 17,000 | - | 8,000 |
| 2-Chlorotoluene | - | 8,300 | - | 7,900 | - | 8,600 | - | 16,000 |
| 4-Chlorotoluene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,2-Dibromo-3-Chloropropane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,2-Dibromomethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Dibromomethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,2-Dichlorobenzene | 64,000 | 8,300 | 70,000 | 7,900 | 63,000 | 8,600 | 52,000 | 8,000 |
| 1,3-Dichlorobenzene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,4-Dichlorobenzene | 1,200 J | 8,300 | 1,400 J | 7,900 | 1,300 J | 8,600 | 1,000 J | 8,000 |
| Dichlorodifluoromethane | - | 17,000 | - | 16,000 | - | 17,000 | - | 16,000 |
| 1,1-Dichloroethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,2-Dichloroethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,1-Dichloroethene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| cis-1,2-Dichloroethene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| trans-1,2-Dichloroethene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,2-Dichloropropane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,3-Dichloropropane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 30
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(28 Day Cure)

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|-----------------------------|-------------------------------|--------|---------------------------|--------|--------------------------------|--------|---------------------------|--------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I TOTAL VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| cis-1,3-Dichloropropene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| trans-1,3-Dichloropropene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,1-Dichloropropene | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Ethylbenzene | 38,000 | 8,300 | 76,000 | 7,900 | - | 8,600 | - | 8,000 |
| 2-Hexanone | - | 17,000 | - | 16,000 | 62,000 | 8,600 | 43,000 | 8,000 |
| Hexachlorobutadiene | 1,000 J | 8,300 | - | 7,900 | - | 17,000 | - | 16,000 |
| Isopropyl benzene | 3,200 J | 8,300 | 5,100 J | 7,900 | - | 8,600 | - | 8,000 |
| p-isopropyltoluene | 2,500 J | 8,300 | 3,000 J | 7,900 | 4,400 J | 8,600 | 3,000 J | 8,000 |
| 4-Methyl-2-pentanone (MIBK) | - | 17,000 | - | 16,000 | 2,600 J | 8,600 | 2,100 J | 8,000 |
| Methylene chloride | - | 8,300 | - | 7,900 | - | 17,000 | - | 16,000 |
| Naphthalene | 43,000 | 8,300 | 57,000 | 16,000 | 38,000 | 8,600 | - | 8,000 |
| n-Propyl benzene | 11,000 | 8,300 | 17,000 | 7,900 | 15,000 | 8,600 | 32,000 | 16,000 |
| Styrene | - | 8,300 | - | 7,900 | - | 8,600 | 10,000 | 8,000 |
| 1,1,1,2-Tetrachloroethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,1,2,2-Tetrachloroethane | - | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Tetrachloroethene | 120,000 | 8,300 | 300,000 | 7,900 | - | 8,600 | - | 8,000 |
| Toluene | 48,000 | 8,300 | 190,000 | 7,900 | 230,000 | 8,600 | 170,000 | 8,000 |
| 1,2,3-Trichlorobenzene | 1,300 J | 8,300 | - | 7,900 | 100,000 | 8,600 | 73,000 | 8,000 |
| 1,2,4-Trichlorobenzene | 3,200 J | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,1,1-Trichloroethane | - | 8,300 | 2,900 J | 7,900 | 2,300 J | 8,600 | 2,200 J | 8,000 |
| 1,1,2-Trichloroethane | - | 8,300 | 13,000 | 7,900 | 1,900 J | 8,600 | 2,700 J | 8,000 |
| Trichloroethene | 17,000 | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| Trichlorofluoromethane | - | 17,000 | 140,000 | 7,900 | 36,000 | 8,600 | 41,000 | 8,000 |
| 1,2,3-Trichloropropane | - | 8,300 | - | 16,000 | - | 17,000 | - | 16,000 |
| 1,2,4-Trimethylbenzene | 68,000 | 8,300 | - | 7,900 | - | 8,600 | - | 8,000 |
| 1,3,5-Trimethylbenzene | 20,000 | 8,300 | 93,000 | 7,900 | 81,000 | 8,600 | 57,000 | 8,000 |
| Vinyl Acetate | - | 17,000 | 27,000 | 7,900 | 25,000 | 8,600 | 17,000 | 8,000 |
| Vinyl Chloride | - | 17,000 | - | 16,000 | - | 17,000 | - | 16,000 |
| o-xylene | 66,000 | 8,300 | - | 16,000 | - | 17,000 | - | 16,000 |
| m-xylene | 190,000 | 8,300 | 110,000 | 7,900 | 97,000 | 8,600 | 64,000 | 8,000 |
| p-xylene | - | 8,300 | 330,000 | 7,900 | 290,000 | 8,600 | 190,000 | 8,000 |
| | | | | 7,900 | | 8,600 | | 8,000 |

DL Detection Limit
 J Estimated Value
 - Non Detectable concentrations

2964_236

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 31
Phase IV: Verification Testing
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(28 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-----------------------------|-------------------------------|-------|---------------------------|-------|--------------------------------|-------|---------------------------|-------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | | | | | |
| Acetone | 440 J | 1,000 | 170 J | 1,000 | 210 J | 1,000 | 470 J | 1,000 |
| Benzene | 11 J | 50 | - | 50 | - | 50 | 2.2 J | 50 |
| Bromobenzene | - | 50 | - | 50 | - | 50 | - | 50 |
| Bromochloromethane | - | 50 | - | 50 | - | 50 | - | 50 |
| Bromodichloromethane | - | 50 | - | 50 | - | 50 | - | 50 |
| Bromoform | - | 50 | - | 50 | - | 50 | - | 50 |
| Bromomethane | - | 100 | - | 100 | - | 100 | - | 100 |
| 2-butanone | 160 J | 1,000 | 37 J | 1,000 | 43 J | 1,000 | 130 J | 1,000 |
| n-Butylbenzene | 39 J | 50 | 9.0 J | 50 | 9.5 J | 50 | 15 J | 50 |
| s-Butylbenzene | 8.3 J | 50 | - | 50 | - | 50 | - | 50 |
| t-Butylbenzene | - | 50 | - | 50 | - | 50 | - | 50 |
| Carbon disulfide | 12 J | 50 | - | 50 | - | 50 | - | 50 |
| Carbon tetrachloride | - | 50 | - | 50 | - | 50 | - | 50 |
| Chlorobenzene | 360 | 50 | 70 | 50 | 170 | 50 | 230 | 50 |
| Chlorodibromomethane | - | 50 | - | 50 | - | 50 | - | 50 |
| Chloroethane | - | 100 | - | 100 | - | 100 | - | 100 |
| 2-Chloroethyl vinyl ether | - | 100 | - | 100 | - | 100 | - | 100 |
| Chloroform | 13 J | 50 | - | 50 | - | 50 | - | 50 |
| Chloromethane | - | 100 | - | 100 | - | 100 | - | 100 |
| 2-Chlorotoluene | - | 50 | - | 50 | - | 50 | - | 50 |
| 4-Chlorotoluene | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,2-Dibromo-3-Chloropropane | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,2-Dibromoethane | - | 50 | - | 50 | - | 50 | - | 50 |
| Dibromomethane | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,2-Dichlorobenzene | 870 | 50 | 270 | 50 | 370 | 50 | 660 | 50 |
| 1,3-Dichlorobenzene | 3.3 J | 50 | - | 50 | - | 50 | - | 50 |
| 1,4-Dichlorobenzene | 18 J | 50 | 4.6 J | 50 | 5.8 J | 50 | 11 J | 50 |
| Dichlorodifluoromethane | - | 100 | - | 100 | - | 100 | - | 100 |
| 1,1-Dichloroethane | 9.5 J | 50 | - | 50 | - | 50 | - | 50 |
| 1,2-Dichloroethane | 16 J | 50 | - | 50 | - | 50 | - | 50 |
| 1,1-Dichloroethene | 3.0 J | 50 | - | 50 | - | 50 | - | 50 |
| cis-1,2-Dichloroethene | 9.2 J | 50 | - | 50 | - | 50 | - | 50 |
| trans-1,2-Dichloroethene | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,2-Dichloropropane | 4.5 J | 50 | - | 50 | 1.3 J | 50 | 1.3 J | 50 |
| 1,3-Dichloropropane | - | 50 | - | 50 | - | 50 | - | 50 |

KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE

TABLE 31
Phase IV: Verification Testing
Summary of SPLP Volatile Organic Analyses - EPA Methods 1312/8260B
(28 Day Cure)

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|-----------------------------|-------------------------------|-----|---------------------------|-----|--------------------------------|-----|---------------------------|-----|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP VOLATILES | | | | | | | | |
| 2,2-Dichloropropane | - | 50 | - | 50 | - | 50 | - | 50 |
| cis-1,3-Dichloropropene | - | 50 | - | 50 | - | 50 | - | 50 |
| trans-1,3-Dichloropropene | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,1-Dichloropropene | - | 50 | - | 50 | - | 50 | - | 50 |
| Ethylbenzene | 1,100 | 50 | 240 | 50 | - | 50 | - | 50 |
| 2-Hexanone | - | 100 | - | 100 | 570 | 50 | 710 | 50 |
| Hexachlorobutadiene | 6.1 J | 50 | - | 50 | - | 100 | - | 100 |
| Isopropyl benzene | 35 J | 50 | 7.6 J | 50 | 14 J | 50 | 19 J | 50 |
| p-isopropyltoluene | - | 50 | - | 50 | 3.4 J | 50 | 5.4 J | 50 |
| 4-Methyl-2-pentanone (MIBK) | 160 | 100 | 13 J | 100 | 39 J | 100 | 120 | 100 |
| Methylene chloride | 8.8 J | 50 | - | 50 | - | 50 | - | 50 |
| Naphthalene | 360 | 50 | 160 | 50 | 170 | 50 | 290 | 50 |
| n-Propyl benzene | 96 | 50 | 25 J | 50 | 39 J | 50 | 55 | 50 |
| Styrene | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,1,1,2-Tetrachloroethane | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,1,2,2-Tetrachloroethane | - | 50 | - | 50 | - | 50 | - | 50 |
| Tetrachloroethene | 3,600 | 50 | 670 | 50 | - | 50 | - | 50 |
| Toluene | 4,100 | 50 | 630 | 50 | 2,200 | 50 | 2,200 | 50 |
| 1,2,3-Trichlorobenzene | - | 50 | - | 50 | 2,400 | 50 | 2,500 | 50 |
| 1,2,4-Trichlorobenzene | 13 J | 50 | 2.9 J | 50 | - | 50 | - | 50 |
| 1,1,1-Trichloroethane | 210 | 50 | 6.3 J | 50 | 3.2 J | 50 | 5.8 J | 50 |
| 1,1,2-Trichloroethane | - | 50 | - | 50 | 73 | 50 | 36 J | 50 |
| Trichloroethene | 2,600 | 50 | - | 50 | - | 50 | - | 50 |
| Trichlorofluoromethane | - | 100 | 120 | 50 | 1,100 | 50 | 1,000 | 50 |
| 1,2,3-Trichloropropane | - | 50 | - | 100 | - | 100 | - | 100 |
| 1,2,4-Trimethylbenzene | - | 50 | - | 50 | - | 50 | - | 50 |
| 1,3,5-Trimethylbenzene | 650 | 50 | 210 | 50 | 280 | 50 | 420 | 50 |
| Vinyl Acetate | 190 | 50 | 57 | 50 | 79 | 50 | 110 | 50 |
| Vinyl Chloride | - | 100 | - | 100 | - | 100 | - | 100 |
| o-xylene | 10 J | 100 | - | 100 | - | 100 | - | 100 |
| m-xylene | 2,100 | 50 | 490 | 50 | 1,000 | 50 | 1,300 | 50 |
| p-xylene | 4,800 | 50 | 1,300 | 50 | 2,800 | 50 | 3,300 | 50 |
| | - | 50 | - | 50 | - | 50 | - | 50 |

DL Detection Limit
 J Estimated Value
 - Non Detectable concentrations

2964_237

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 32
Phase IV: Verification Testing
Summary of Total PCB & Pesticide Analyses - EPA Method 8081/8082/325.2/1010
(28 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | | | |
|---------------------------------|-------------------------------|--------|---------------------------|--------|--------------------------------|--------|---------------------------|--------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL PESTICIDES | | | | | | | | |
| alpha-BHC | - | 220 | - | 210 | - | 230 | - | 210 |
| beta-BHC | - | 220 | - | 210 | - | 230 | - | 210 |
| delta-BHC | - | 220 | - | 210 | - | 230 | - | 210 |
| gamma-BHC (Lindane) | - | 220 | - | 210 | - | 230 | - | 210 |
| Heptachlor | - | 220 | - | 210 | - | 230 | - | 210 |
| Aldrin | - | 220 | - | 210 | - | 230 | - | 210 |
| Heptachlor epoxide | - | 220 | - | 210 | - | 230 | - | 210 |
| Endosulfan I | - | 220 | - | 210 | - | 230 | - | 210 |
| Dieldrin | - | 440 | - | 420 | - | 450 | - | 420 |
| 4,4'-DDE | - | 440 | - | 420 | - | 450 | - | 420 |
| Endrin | - | 440 | - | 420 | - | 450 | - | 420 |
| Endosulfan II | - | 440 | - | 420 | - | 450 | - | 420 |
| 4,4'-DDD | - | 440 | - | 420 | - | 450 | - | 420 |
| Endosulfan Sulfate | - | 440 | - | 420 | - | 450 | - | 420 |
| 4,4'-DDT | - | 440 | - | 420 | - | 450 | - | 420 |
| Methoxychlor | - | 2,200 | - | 2,100 | - | 2,300 | - | 2,100 |
| Endrin Ketone | - | 440 | - | 420 | - | 450 | - | 420 |
| Endrin aldehyde | - | 440 | - | 420 | - | 450 | - | 420 |
| alpha-Chlordane | - | 220 | - | 210 | - | 230 | - | 210 |
| gamma-Chlordane | - | 220 | - | 210 | - | 230 | - | 210 |
| Toxaphene | - | 4400 | - | 4200 | - | 4500 | - | 4200 |
| II. TOTAL PCBs | | | | | | | | |
| Aroclor-1016 | - | 22,000 | - | 21,000 | - | 23,000 | - | 21,000 |
| Aroclor-1221 | - | 22,000 | - | 21,000 | - | 23,000 | - | 21,000 |
| Aroclor-1232 | - | 22,000 | - | 21,000 | - | 23,000 | - | 21,000 |
| Aroclor-1242 | 450,000 | 22,000 | 380,000 | 21,000 | 390,000 | 23,000 | 290,000 | 21,000 |
| Aroclor-1248 | - | 22,000 | - | 21,000 | - | 23,000 | - | 21,000 |
| Aroclor-1254 | - | 22,000 | - | 21,000 | - | 23,000 | - | 21,000 |
| Aroclor-1260 | - | 22,000 | - | 21,000 | - | 23,000 | - | 21,000 |
| III. ADDITIONAL ANALYSES | | | | | | | | |
| Total Chloride (mg/kg) | 5,700 | 210 | 3,000 | 200 | 4,200 | 220 | 5,800 | 210 |
| Ignitability, Flash Point (°C) | > 95 | NA | > 95 | NA | > 95 | NA | > 95 | NA |

DL Detection Limit
- Non Detectable Concentrations
NA Not Applicable

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 33
Phase IV: Verification Testing
Summary of SPLP PCB & Pesticide Analyses - EPA Method 1312/8081/8082
(28 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (ug/L) | | | | | | | |
|---------------------------|-------------------------------|------|---------------------------|------|--------------------------------|------|---------------------------|------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 w/o Iron Addition | | 2964-023 Iron Addition | | 2964-022 w/o Iron Addition | | 2964-024 Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP PESTICIDES | | | | | | | | |
| alpha-BHC | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| beta-BHC | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| delta-BHC | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| gamma-BHC (Lindane) | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Heptachlor | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aldrin | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Heptachlor epoxide | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Endosulfan I | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Dieldrin | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| 4,4'-DDE | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| Endrin | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| Endosulfan II | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| 4,4'-DDD | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| Endosulfan Sulfate | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| 4,4'-DDT | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| Methoxychlor | - | 5.0 | - | 5.0 | - | 5.0 | - | 5.0 |
| Endrin Ketone | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| Endrin aldehyde | - | 1.0 | - | 1.0 | - | 1.0 | - | 1.0 |
| alpha-Chlordane | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| gamma-Chlordane | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Toxaphene | - | 10 | - | 10 | - | 10 | - | 10 |
| II. SPLP PCBs | | | | | | | | |
| Aroclor-1016 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1221 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1232 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1242 | 2.0 | 0.50 | 0.52 | 0.50 | 0.60 | 0.50 | 1.2 | 0.50 |
| Aroclor-1248 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1254 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Aroclor-1260 | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |

DL - Detection Limit
- Non Detectable Concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 34
Phase IV: Verification Testing
Summary of Total TAL Metals Analyses - EPA Methods 6010B / 7471
(28 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (mg/kg) | | | | | | | |
|----------------------------|---------------------|-------|---------------|-------|--------------------------------|-------|---------------|-------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 | | 2964-023 | | 2964-022 | | 2964-024 | |
| | w/o Iron Addition | | Iron Addition | | w/o Iron Addition | | Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL TAL METALS | | | | | | | | |
| Aluminum | 12,800 | 6.7 | 9,800 | 6.3 | 11,000 | 6.8 | 9,000 | 6.4 |
| Antimony | 4.2 | 1.3 | 5.8 | 1.3 | 5.0 | 1.4 | 3.1 | 1.3 |
| Arsenic | 14 | 2.7 | 35 | 2.5 | 13 | 2.7 | 33 | 2.6 |
| Barium | 676 | 0.67 | 600 | 0.63 | 660 | 0.68 | 450 | 0.64 |
| Beryllium | - | 0.67 | - | 0.63 | - | 0.68 | - | 0.64 |
| Cadmium | 29.9 | 0.67 | 24 | 0.63 | 29 | 0.68 | 17 | 0.64 |
| Calcium | 75,500 | 1,300 | 69,000 | 1,300 | 120,000 | 1,400 | 120,000 | 1,300 |
| Chromium | 292 | 1.3 | 300 | 1.3 | 250 | 1.4 | 200 | 1.3 |
| Cobalt | 4.97 | 1.3 | 13 | 1.3 | 3.9 | 1.4 | 10 | 1.3 |
| Copper | 3,510 | 130 | 3,000 | 1.3 | 2,700 | 140 | 2,800 | 1.3 |
| Iron | 20,800 | 2.7 | 130,000 | 250 | 19,000 | 2.7 | 87,000 | 260 |
| Lead | 1,100 | 330 | 960 | 320 | 790 | 140 | 590 | 320 |
| Magnesium | 5,830 | 33 | 4,600 | 32 | 5,300 | 34 | 4,700 | 32 |
| Manganese | 291 | 0.67 | 620 | 0.63 | 280 | 0.68 | 500 | 0.64 |
| Mercury | 9.9 | 3.3 | 7.2 | 3.2 | 7.6 J | 17 | 1.3 J | 3.2 |
| Nickel | 60.1 | 2.7 | 160 | 2.5 | 48 | 2.7 | 76 | 2.6 |
| Potassium | 1,260 | 67 | 900 | 63 | 1,200 | 68 | 1,000 | 64 |
| Selenium | 3.5 | 2.7 | 1.8 | 1.3 | 6.2 | 5.5 | 2.7 | 2.6 |
| Silver | - | 2.7 | - | 2.5 | - | 2.7 | - | 2.6 |
| Sodium | 10,900 | 33 | 8,800 | 32 | 9,000 | 34 | 15,000 | 32 |
| Thallium | - | 0.67 | 1.1 | 0.63 | 0.85 | 0.68 | 0.94 | 0.32 |
| Vanadium | 38.8 | 0.67 | 47 | 0.63 | 35 | 0.68 | 37 | 0.64 |
| Zinc | 2,850 | 1.3 | 2,500 | 1.3 | 2,700 | 1.4 | 1,600 | 1.3 |

- Non Detectable Concentrations

DL Detection Limit

J Estimated Value

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 35
Phase IV: Verification Testing
Summary of SPLP TAL Metals Analyses - EPA Methods 1312 / 6010B / 7470
(28 Day Cure)**

| ANALYTICAL PARAMETER | RESULTS (mg/L) | | | | | | | |
|---------------------------|---------------------|--------|---------------|--------|--------------------------------|--------|---------------|--------|
| | 10% Cement Addition | | | | 10% Cement / 10% Hydrated Lime | | | |
| | 2964-021 | | 2964-023 | | 2964-022 | | 2964-024 | |
| | w/o Iron Addition | | Iron Addition | | w/o Iron Addition | | Iron Addition | |
| | Conc. | DL | Conc. | DL | Conc. | DL | Conc. | DL |
| I. SPLP TAL METALS | | | | | | | | |
| Aluminum | 0.21 | 0.10 | 0.22 | 0.10 | 0.17 | 0.10 | - | 0.10 |
| Antimony | - | 0.02 | - | 0.02 | - | 0.02 | - | 0.02 |
| Arsenic | 0.014 | 0.004 | 0.013 | 0.004 | 0.014 | 0.004 | 0.0098 | 0.004 |
| Barium | 0.046 | 0.01 | 0.054 | 0.01 | 0.063 | 0.01 | 0.077 | 0.01 |
| Beryllium | - | 0.01 | - | 0.01 | - | 0.01 | - | 0.01 |
| Cadmium | - | 0.01 | - | 0.01 | - | 0.01 | - | 0.01 |
| Calcium | 150 | 0.20 | 160 | 0.20 | 410 | 0.20 | 430 | 0.20 |
| Chromium | 0.03 | 0.02 | 0.023 | 0.02 | - | 0.02 | - | 0.02 |
| Cobalt | - | 0.02 | - | 0.02 | - | 0.02 | - | 0.02 |
| Copper | 1.4 | 0.02 | 2.4 | 0.02 | 3.0 | 0.02 | 3.1 | 0.02 |
| Iron | 0.32 | 0.04 | 0.30 | 0.04 | 0.18 | 0.04 | 0.071 | 0.04 |
| Lead | - | 0.005 | - | 0.005 | 0.17 | 0.025 | 0.096 | 0.025 |
| Magnesium | - | 0.50 | - | 0.50 | - | 0.50 | - | 0.50 |
| Manganese | - | 0.01 | - | 0.01 | - | 0.01 | - | 0.01 |
| Mercury | 0.0024 | 0.0002 | 0.001 | 0.0002 | 0.0011 | 0.0002 | 0.00087 | 0.0002 |
| Nickel | 0.05 | 0.04 | 0.043 | 0.04 | 0.055 | 0.04 | - | 0.04 |
| Potassium | 10 | 1.0 | 9.2 | 1.0 | 9.8 | 1.0 | 8.4 | 1.0 |
| Selenium | - | 0.004 | - | 0.004 | - | 0.004 | - | 0.004 |
| Silver | - | 0.01 | - | 0.01 | - | 0.01 | - | 0.01 |
| Sodium | 470 | 2.5 | 350 | 2.5 | 330 | 2.5 | 300 | 2.5 |
| Thallium | - | 0.005 | - | 0.005 | - | 0.005 | - | 0.005 |
| Vanadium | 0.029 | 0.01 | 0.021 | 0.01 | - | 0.01 | - | 0.01 |
| Zinc | 0.027 | 0.02 | 0.024 | 0.02 | 0.41 | 0.02 | 0.15 | 0.02 |

- Non Detectable Concentrations
J Estimated Value
DL Detection Limit

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 36
Phase IV: Verification Testing
Summary of Unconfined Compressive Strength Testing - ASTM D 2166
(28 Day Cure)**

| KIBER SAMPLE No. | MATERIAL TYPE | REAGENT TYPE (1) | REAGENT ADDITION (%) (3) | WATER ADDITION (%) (3) | UNCONFINED COMPRESSIVE STRENGTH TESTING (UCS) (4) | | | | VOLUMETRIC EXPANSION (%) (4) |
|-------------------------------------|------------------|--|--------------------------------|------------------------------|---|---|--|-------------------------------|------------------------------------|
| | | | | | Moisture Content (%) | Bulk Density (lbs/ft ³) | Dry Density (lbs/ft ³) | UCS (lbs/in ²) | |
| AIR STRIPPING (2) | | | | | | | | | |
| 2964-021 | Parent A | Type I Portland Cement | 10 | 5 | 29 | 105 | 81 | 71 | 4 |
| 2964-022 | Parent B | Type I Portland Cement / Hydrated Lime | 10 / 10 | 17 | 30 | 92 | 71 | 53 | 32 |
| AIR STRIPPING AND IRON ADDITION (3) | | | | | | | | | |
| 2964-023 | Parent A | Type I Portland Cement | 10 | 4.5 | 22 | 113 | 92 | 84 | 7 |
| 2964-024 | Parent B | Type I Portland Cement / Hydrated Lime | 10 / 10 | 15 | 31 | 102 | 79 | 42 | 32 |

(1) Reagents were blended dry, slurried with water and added to the specified material and blended.

(2) These mixtures were developed with material that was air stripped for 120 minutes. After air stripping and iron addition for mixtures 022 and 024, the mixtures were allowed to set for 3 days at which time the stabilization reagents were added. After addition of the stabilization reagents, the materials were allowed to cure for a period of 28 days.

(3) For a mixture with 10% reagent addition and 10% water addition, 20 grams of reagent will be slurried with 20 grams of water and added to 200 grams of untreated material.

(4) Unconfined compressive strength and volumetric expansion testing were performed after 28 days of curing.

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 37
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Control Samples)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | |
|-----------------------------|-----------------|-----------|------------------|-----------|-------------------------|-----------|
| | Initial Control | | Control - 3 Days | | Final Control - 28 Days | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | |
| Acetone | 170,000 J | 1,600,000 | 73,000 J | 1,600,000 | - | 1,800,000 |
| Benzene | 30,000 J | 79,000 | 18,000 J | 79,000 | - | 89,000 |
| Bromobenzene | - | 79,000 | - | 79,000 | - | 89,000 |
| Bromochloromethane | - | 79,000 | - | 79,000 | - | 89,000 |
| Bromodichloromethane | - | 79,000 | - | 79,000 | - | 89,000 |
| Bromoform | - | 79,000 | - | 79,000 | - | 89,000 |
| Bromomethane | - | 160,000 | - | 160,000 | - | 180,000 |
| 2-butanone | 170,000 J | 1,600,000 | 74,000 J | 1,600,000 | - | 1,800,000 |
| n-Butylbenzene | 28,000 J | 79,000 | 28,000 J | 79,000 | 15,000 J | 89,000 |
| s-Butylbenzene | 6,800 J | 79,000 | 8,400 J | 79,000 | - | 89,000 |
| t-Butylbenzene | - | 79,000 | - | 79,000 | - | 89,000 |
| Carbon disulfide | - | 79,000 | - | 79,000 | - | 89,000 |
| Carbon tetrachloride | - | 79,000 | - | 79,000 | - | 89,000 |
| Chlorobenzene | 190,000 | 79,000 | 150,000 J | 79,000 | 42,000 J | 89,000 |
| Chlorodibromomethane | - | 79,000 | - | 79,000 | - | 89,000 |
| Chloroethane | - | 160,000 | - | 160,000 | - | 180,000 |
| 2-Chloroethyl vinyl ether | - | 160,000 | - | 160,000 | - | 180,000 |
| Chloroform | 81,000 | 79,000 | 49,000 J | 79,000 | - | 89,000 |
| Chloromethane | - | 160,000 | - | 160,000 | - | 180,000 |
| 2-Chlorotoluene | - | 79,000 | - | 79,000 | - | 89,000 |
| 4-Chlorotoluene | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,2-Dibromo-3-Chloropropane | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,2-Dibromoethane | - | 79,000 | - | 79,000 | - | 89,000 |
| Dibromomethane | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,2-Dichlorobenzene | 200,000 | 79,000 | 180,000 J | 79,000 | 86,000 J | 89,000 |
| 1,3-Dichlorobenzene | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,4-Dichlorobenzene | - | 79,000 | - | 79,000 | - | 89,000 |
| Dichlorodifluoromethane | - | 160,000 | - | 160,000 | - | 180,000 |
| 1,1-Dichloroethane | - | 79,000 | 30,000 J | 79,000 | - | 89,000 |
| 1,2-Dichloroethane | - | 79,000 | 45,000 J | 79,000 | - | 89,000 |
| 1,1-Dichloroethene | - | 79,000 | - | 79,000 | - | 89,000 |
| cis-1,2-Dichloroethene | 20,000 J | 79,000 | 11,000 J | 79,000 | - | 89,000 |
| trans-1,2-Dichloroethene | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,2-Dichloropropane | 13,000 J | 79,000 | - | 79,000 | - | 89,000 |
| 1,3-Dichloropropane | - | 79,000 | - | 79,000 | - | 89,000 |

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 37
Phase IV: Verification Testing
Summary of Total Volatile Organic Analyses - EPA Method 8260B
(Control Samples)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | |
|-----------------------------|-----------------|---------|------------------|---------|-------------------------|---------|
| | Initial Control | | Control - 3 Days | | Final Control - 28 Days | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL VOLATILES | | | | | | |
| 2,2-Dichloropropane | - | 79,000 | - | 79,000 | - | 89,000 |
| cis-1,3-Dichloropropene | - | 79,000 | - | 79,000 | - | 89,000 |
| trans-1,3-Dichloropropene | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,1-Dichloropropene | - | 79,000 | - | 79,000 | - | 89,000 |
| Ethylbenzene | 730,000 | 79,000 | 630,000 | 79,000 | 210,000 | 89,000 |
| 2-Hexanone | - | 160,000 | - | 160,000 | - | 180,000 |
| Hexachlorobutadiene | - | 79,000 | - | 79,000 | - | 89,000 |
| Isopropyl benzene | 27,000 J | 79,000 | 25,000 J | 79,000 | 10,000 J | 89,000 |
| p-isopropyltoluene | 8,700 J | 79,000 | 9,400 J | 79,000 | - | 89,000 |
| 4-Methyl-2-pentanone (MIBK) | 320,000 | 160,000 | 190,000 | 160,000 | - | 180,000 |
| Methylene chloride | 79,000 J | 79,000 | 33,000 J | 79,000 | - | 89,000 |
| Naphthalene | 67,000 J | 160,000 | 62,000 J | 160,000 | 46,000 J | 180,000 |
| n-Propyl benzene | 73,000 J | 79,000 | 69,000 J | 79,000 | 30,000 J | 89,000 |
| Styrene | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,1,1,2-Tetrachloroethane | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,1,2,2-Tetrachloroethane | - | 79,000 | - | 79,000 | - | 89,000 |
| Tetrachloroethene | 4,300,000 | 79,000 | 4,600,000 | 79,000 | 1,400,000 | 89,000 |
| Toluene | 4,100,000 | 79,000 | 3,700,000 | 79,000 | 790,000 | 89,000 |
| 1,2,3-Trichlorobenzene | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,2,4-Trichlorobenzene | - | 79,000 | 7,800 J | 79,000 | - | 89,000 |
| 1,1,1-Trichloroethane | 850,000 | 79,000 | 580,000 | 79,000 | 85,000 J | 89,000 |
| 1,1,2-Trichloroethane | 11,000 J | 79,000 | - | 79,000 | - | 89,000 |
| Trichloroethene | 5,500,000 | 79,000 | 4,700,000 | 79,000 | 710,000 | 89,000 |
| Trichlorofluoromethane | - | 160,000 | - | 160,000 | - | 180,000 |
| 1,2,3-Trichloropropane | - | 79,000 | - | 79,000 | - | 89,000 |
| 1,2,4-Trimethylbenzene | 300,000 | 79,000 | 280,000 | 79,000 | 130,000 | 89,000 |
| 1,3,5-Trimethylbenzene | 97,000 | 79,000 | 96,000 | 79,000 | 44,000 J | 89,000 |
| Vinyl Acetate | - | 160,000 | - | 160,000 | - | 180,000 |
| Vinyl Chloride | - | 160,000 | - | 160,000 | - | 180,000 |
| o-xylene | 800,000 | 79,000 | 690,000 | 79,000 | 250,000 | 89,000 |
| m-xylene | 2,800,000 | 79,000 | 2,400,000 | 79,000 | 920,000 | 89,000 |
| p-xylene | - | 79,000 | - | 79,000 | - | 89,000 |

DL Detection Limit
J Estimated Value
- Non Detectable concentrations

**KIBER ENVIRONMENTAL SERVICES, INC.
GOLDER ASSOCIATES, INC.
216 PATERSON PLANK ROAD SITE**

**TABLE 38
Phase IV: Verification Testing
Summary of Total PCB Analyses - EPA Method 8082/325.2
(Control Samples)**

| ANALYTICAL PARAMETER | RESULTS (ug/kg) | | | | | |
|--------------------------------|-----------------|---------|------------------|--------|-------------------------|--------|
| | Initial Control | | Control - 3 Days | | Final Control - 28 Days | |
| | Conc. | DL | Conc. | DL | Conc. | DL |
| I. TOTAL PCBs | | | | | | |
| Aroclor-1016 | - | 260,000 | - | 26,000 | - | 26,000 |
| Aroclor-1221 | - | 260,000 | - | 26,000 | - | 26,000 |
| Aroclor-1232 | - | 260,000 | - | 26,000 | - | 26,000 |
| Aroclor-1242 | 1,600,000 | 260,000 | 770,000 | 26,000 | 620,000 | 26,000 |
| Aroclor-1248 | - | 260,000 | - | 26,000 | - | 26,000 |
| Aroclor-1254 | - | 260,000 | - | 26,000 | - | 26,000 |
| Aroclor-1260 | - | 260,000 | - | 26,000 | - | 26,000 |
| II. ADDITIONAL ANALYSES | | | | | | |
| Total Chloride (mg/kg) | 2,700 | 1,300 | 5,500 | 1,300 | 8,500 | 230 |

DL Detection Limit

- Non Detectable Concentrations

**EPA Superfund
Record of Decision:**

**SCIENTIFIC CHEMICAL PROCESSING
EPA ID: NJD070565403
OU 02
CARLSTADT, NJ
08/12/2002**

DECLARATION STATEMENT

SITE NAME AND LOCATION

Scientific Chemical Processing (EPA ID#-NJ070565403) Carlstadt Township, Bergen County, New Jersey, Operable Unit 2

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Selected Remedy for the contaminated soil on the Scientific Chemical Processing Site located in Carlstadt Township, Bergen County, New Jersey. The Selected Remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the Administrative Record file for the site.

The State of New Jersey concurs with the Selected Remedy.

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision is necessary to protect public health or welfare or the environment from actual or threatened release of hazardous substances from the site into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Selected Remedy described in this document involves the remediation of an area of highly-contaminated sludge on the site ("Hot Spot" Area) and improvements to the existing interim remedy for the remainder of the Fill Area. The Fill Area includes all soils, sludges and groundwater above the shallow clay layer and inside the existing containment slurry wall. Construction of the interim remedy was completed in 1992 pursuant to a 1990 Record of Decision. Additional remedial actions are planned to address contaminated groundwater outside the Fill Area and sediments within Peach Island Creek.

The major components of the Selected Remedy follow:

- Air stripping of the Hot Spot area until levels of Volatile Organic Compounds are reduced to whichever is more stringent: the average VOC levels in Fill Area outside the Hot Spot, or to a level where interference with stabilization will not occur. VOCs released during treatment will be collected and treated on site, or adsorbed to assure no negative impacts to the surrounding community.
- Soil stabilization of the Hot Spot using cement and lime, so that the Hot Spot is solidified to performance standards to be developed during the design phase of the remedy. The solidification and stabilization will effect containment of polychlorinated byphenols (PCBs) and other non- volatile or semi-volatile contaminants
- Installation of a landfill cap over the entire Fill Area. The cap will consist of a 2-foot thick "double containment" cover system, which will be constructed over the entire area currently circumscribed by the existing slurry wall.
- Improvement of the existing, interim groundwater recovery system, which consists of above-ground piping, and recovery wells screened, in the Fill Area. The improvements will include the installation of new extraction wells along the perimeter of the site, construction of underground clean utility corridors for the wells, and piping and electrical system to allow more flexibility for future uses of the site. The extracted groundwater will either be collected in the existing above-ground tank for disposal, or pumped, via sewer connection, to the Bergen County Publicly Owned

Treatment Works (POTW) for treatment.

- The existing sheet pile wall along Peach Island Creek, which protects the slurry wall along the riparian side of the Fill Area, will be improved and upgraded.

While EPA believes the Hot Spot treatment portion of the Selected Remedy will be effective, if appropriate performance standards for treatment, solidification and containment are not met, then removal of the Hot Spot, as described in the Record of Decision's Alternative SC-3, will be performed.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1: Statutory Requirements

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable.

Part 2: Statutory Preference for Treatment

The Selected Remedy satisfies the statutory preference for treatment as a principal element of the remedy.

Part 3: Five-Year Review Requirements

The Selected Remedy allows hazardous substances, pollutants or contaminants to remain at this site above levels which would allow for unlimited use and unrestricted exposure. Pursuant to CERCLA Section 121 (c), EPA is required to conduct five-year reviews of the remedies selected at this site. The first five-year review was completed on September 30, 1998. This decision document reviewed the remedy selected in the 1990 Record of Decision, designated the first operable unit (OU1), and subsumes and replaces it with a final on-site remedy, designated OU2. This Record of Decision constitutes the second five-year review of the site. As indicated elsewhere, this remedy is expected to be protective of human health and the environment when it is fully implemented. The next five-year review will be conducted within five years of the date of this Record of Decision.

Since the remedy selected in this decision document has not been implemented and the remedy for groundwater and off-site contamination (designated OU3) has not been selected, the exposure pathways that could result in unacceptable risks are being controlled by measures which limit current property and groundwater uses.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for site.

- Chemicals of concern and their respective concentrations may be found in the "Summary of Site Characteristics" section.
- Baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section.
- A discussion of source materials constituting principal threats may be found in the "Principal Threat Waste" section.
- Current and reasonably anticipated future land use assumptions are discussed in the "Current and Potential Future Site and Resource Uses" section.

- Estimated capital, annual operation and maintenance, and total present worth costs are discussed in the "Description of Remedial Alternatives" section.
- Key factors that led to selecting the remedy (i.e., how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, emphasizing criteria key to the decision) may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Jane M. Kenny
Regional Administrator
Region II

Date

DECISION SUMMARY
Operable Unit Two
Scientific Chemical Processing Site
Carlstadt, Bergen County, New Jersey

United States Environmental Protection Agency
Region II
July 2002

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SITE NAME LOCATION AND DESCRIPTION

The six-acre Scientific Chemical Processing (SCP) Site is located at 216 Paterson Plank Road in Carlstadt, New Jersey. The Site is a corner property, bounded by Paterson Plank Road on the south, Gotham Parkway on the west, Peach Island Creek on the north and an industrial facility on the east (Figure 1). The land use in the vicinity of the Site is classified as light industrial by the Borough of Carlstadt. The establishments in the immediate vicinity of the Site include a bank, stables, warehouses, freight carriers, and service sector industries. There is a residential area located approximately 6,000 feet northwest of the Site.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Early Operations

The land on which the SCP Site is located was purchased in 1941 by Patrick Marrone who used the land for solvent refining and solvent recovery. Mr. Marrone eventually sold the land to a predecessor of Inmar Associates, Inc. Aerial photographs from the 1950s, 1960s and 1970s indicate that drummed materials were stored on the Site. On October 31, 1970, SCP Inc. leased the Site from Inmar Associates. SCP used the Site for processing industrial wastes from 1971 until the company was shut down by court order in 1980.

While in operation, SCP received liquid byproduct streams from chemical and industrial manufacturing firms, then processed the materials to reclaim marketable products, which were sold to the originating companies. In addition, liquid hydrocarbons were processed to some extent, then blended with fuel oil. The mixtures were typically sold back to the originating companies, or to cement and aggregate kilns as fuel. SCP also received other wastes, including paint sludges, acids and other unknown chemical wastes.

Site Discovery, State and Federal Response Actions

In 1983, the Site was placed on the National Priorities List (NPL). Between 1983 and 1985, the New Jersey Department of Environmental Protection (NJDEP) required the site owner to remove approximately 250,000 gallons of wastes stored in tanks, which had been abandoned at the Site.

In May 1985, EPA assumed the lead role in the response actions, and issued notice letters to over 140 Potentially Responsible Parties (PRPs). EPA offered the PRPs an opportunity to perform a Remedial Investigation and Feasibility Study (RI/FS) for the Site. The purpose of an RI/FS is to determine the nature and extent of a site's contamination, and then to develop remedial alternatives which address that contamination. In September 1985, EPA issued Administrative Orders on Consent to the 108 PRPs who had agreed to conduct the RI/FS. Subsequently, in October 1985, EPA issued a Unilateral Order to 31 PRPs who failed to sign the Consent Order. The Unilateral Order required the 31 PRPs to cooperate with the 108 consenting PRPs on the RI/FS. In the fall of 1985, EPA also issued an Administrative Order to Inmar Associates, requiring the company to remove and properly dispose of the contents of five tanks containing wastes contaminated with polychlorinated biphenyls (PCBs) and numerous other hazardous substances.

Inmar removed four of the five tanks in 1986. The fifth tank was not removed at the time due to the high levels of PCBs and other contaminants found in that specific tank, and the unavailability of disposal facilities capable of handling those wastes. The fifth tank and its contents were subsequently removed and disposed of by the PRPs in February 1998.

The PRPs initiated the RI/FS in April 1987. In March 1990, a final RI was completed. The RI focused on the most heavily contaminated zone at the Site which included the contaminated soils, sludges and shallow groundwater down to the clay layer (hereinafter, this zone will be referred to as the "Fill Area"). The RI also collected data from the deeper groundwater areas. The deeper areas consist of the till aquifer, which lies just

under the Fill Area's clay layer, and the bedrock aquifer which underlies the till aquifer. Groundwater within both the till aquifer and bedrock aquifer was found to be contaminated with site-related compounds. The RI also found that the adjacent Peach Island Creek's surface water and sediments were impacted by contaminants similar to those found in the Fill Area.

Prior to issuing a final RI, an FS was completed in 1989. Based on data from the draft RI, the FS analyzed alternatives for the Fill Area groundwater and sludge/soils. The alternatives analyzed included the combined use of a slurry wall, dewatering, caps, vacuum extraction and in-situ stabilization technologies. The results of the FS indicated that, although there seemed to be several potential methods or combinations of methods to remedy the Fill Area soil and sludges, there were uncertainties regarding the relative effectiveness of the various technologies. Consequently, EPA made a decision that treatment alternatives needed further assessment. In the meantime, interim measures were necessary to contain and prevent exposure to the Fill Area contaminants. Therefore, based on the findings of the RI and FS, a Record of Decision (ROD) for an interim remedy for the Fill Area was issued by EPA in September 1990.

Operable Unit 1 Remedy

EPA typically addresses sites, particularly the more complex ones, in separate phases and/or operable units. In developing an overall strategy for the SCP Site, EPA has identified the interim Fill Area remedy as Operable Unit 1 (OU1), the final Fill Area remedy as OU2, and the groundwater/Peach Island Creek remedy as OU3.

As stated previously, EPA issued a ROD on September 14, 1990 describing the selection of an interim remedial action for the Fill Area to prevent exposure to site soils and prevent the contaminated groundwater within the Fill Area from migrating off the property. The interim remedy was constructed from August 1991 through June 1992 by the PRPs for the Site pursuant to a Unilateral Administrative Order, dated September 28, 1990, and consists of the following:

1. A lateral containment wall comprised of a soil-bentonite slurry with an integral high density polyethylene (HDPE) vertical membrane which is keyed into the clay layer and circumscribes the property;
2. A sheet pile retaining wall along Peach Island Creek. The retaining wall was installed to facilitate construction of the slurry wall. Regular monitoring has shown that the retaining wall has remained stable since completion of the slurry wall installation;
3. A horizontal infiltration barrier consisting of high density polyethylene covering the property;
4. An extraction system for shallow groundwater consisting of seven (since reduced to five) wells screened in the Fill Area, which discharge to an above-ground 10,000 gallon tank via above-grade pipes. The water from the tank is disposed of off-site;
5. A chain link fence which circumscribes the property; and
6. Quarterly (since made annual) groundwater monitoring for metals and organics. Operation and Monitoring reports on the current conditions at the Site are submitted to EPA on a monthly basis.

The interim remedy has effectively mitigated the risks from direct contact with Fill Area contamination and the spread of Fill Area contamination since its implementation in 1992.

Operable Unit 2 and Operable Unit 3 Remedy

While implementing the interim remedy (i.e., OU1), EPA continued to oversee additional

RI/FS work which would provide information to prepare Records of Decision for OU2 and OU3. In March 1994, the PRPs presented to EPA nine remedial technologies which the PRPs considered potentially applicable to the Site. In December of that year, EPA requested that the PRPs further review and reduce the list of potential technologies. In 1995, the PRPs submitted a Focused Feasibility Study Workplan (FFS) to evaluate both the groundwater contamination (to be addressed in OU3) and the following reduced list of remedial technologies for the Fill Area; 1) containment; 2) "Hot Spot" removal; 3) stabilization; 4) bioremediation; and 5) thermal desorption.

The FFS identified a number of severe limitations and complex issues associated with the site-wide ex-situ remedial options, including difficulties associated with the large amount of massive construction and demolition debris contained within the Fill Area. These findings are presented in detail in the 1997 Focused Feasibility Investigation Workplan (FFSI). The FFSI established the following working definition for the "Hot Spot" area:

- An area where, if chemical constituents were removed and/or treated, the site-wide risk would be reduced by over an order of magnitude; and
- An area small enough to be considered separately from remediation of the entire Fill Area.

Based on previous findings, it was determined that sludge in one portion of the Fill Area fit the definition of "Hot Spot" (see Figure 2). The FFSI also determined that treatability studies were necessary to determine the best in-situ methods to address this Fill Area sludge (i.e., the Hot Spot area). In 1998, the PRPs submitted a Treatability Testing Workplan to test these technologies. The results of the testing were submitted to EPA in the July 2000 Treatability Study Final Report.

Additional groundwater and surface water sampling will continue to be conducted in preparation for the development of remedial alternatives for groundwater contamination and Peach Island Creek. Based on the existing information relating to the Fill Area, EPA has elected to move forward with the permanent remedy for OU2 independent of the OU3 remedy, which will be the subject of a future ROD. Thus, the following summary focuses on the OU2 efforts.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan and the supporting documentation for OU2 were released to the public for comment on August 15, 2001. These documents were made available to the public at the EPA Administrative Record File Room, 290 Broadway, 18th Floor, New York, NY; and at the William E. Demody Free Public Library, 420 Hackensack St, Carlstadt, NJ.

On August 15, 2001, EPA issued a notice in the Bergen County Record, which contained a summary of EPA's Proposed Remedy for OU2 and information relevant to the public comment period for this site, including the duration of the comment period, the date of the public meeting and the availability of the administrative record. The public comment period began on August 15, 2001 and initially ended on September 15, 2001, but was extended through a public notice in the Bergen County Record through October 25, 2001. The extension was given to allow mail which may have been lost or delayed due to events on September 11, 2001 to be resubmitted. A public meeting was held on August 23, 2001, at the Carlstadt Borough Hall located at 500 Madison St., Carlstadt, NJ. The purpose of the meeting was to inform local officials and interested citizens about the Superfund process, to discuss the Proposed Plan, to receive comments on the Proposed Plan, and to respond to questions from area residents and other interested parties. In general, the public supported the Agency's proposed remedy, Alternative SC-5; Air Stripping, Capping, Solidification/Stabilization and Shallow Groundwater Collection. Responses to comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (Appendix V).

SCOPE AND ROLE OF RESPONSE ACTION

As with many Superfund sites, the problems at the SCP Site are complex. As a result, EPA has organized the work into three distinct phases or operable units. The name of each operable unit and the portions of the Site that each operable unit includes are listed below:

- Operable Unit 1: Fill Area, interim remedy.
- Operable Unit 2: Fill Area, permanent remedy.
- Operable Unit 3: Groundwater contamination outside the defined Fill Area and the Peach Island Creek.

OU2, the subject of this ROD, addresses the Fill Area contaminants. As indicated in the 1990 OU1 ROD, the interim remedy will be a key component of the OU2 final Fill Area remedy.

SUMMARY OF SITE CHARACTERISTICS

The results of the RI indicate that the Site stratigraphy consists of the following units, in descending order with depth: earthen fill material (average thickness of approximately 8.4 feet across the Site); peat (thickness ranging from 0 to approximately 1.8 feet across the Site); gray silt (average thickness ranging from 0 to 19 feet across the Site); till (consisting of sand, clay and gravel, average thickness of approximately 20 feet across the Site); and bedrock.

The Site is underlain by three groundwater units which are described as the "shallow aquifer," the "till aquifer" and the "bedrock aquifer" in descending order with depth. The natural water table is found in the shallow aquifer at a depth of approximately two feet below the land surface. The till aquifer consists of the water-bearing unit between the clay and the bedrock. The bedrock aquifer is the most prolific of the three aquifers and is used regionally for potable and industrial purposes. Results of hydrogeologic tests conducted during the RI indicate that the three aquifers are hydraulically connected. Chemical analyses of groundwater from the three aquifers provide further support to this finding. Specifically, chemical data collected during the RI demonstrated that contaminants, including chloroform, 1,2-dichloroethane, and vinyl chloride from the shallow aquifer have migrated across the clay-silt layer into the till and bedrock aquifers.

Physical Characteristics

Test pit and boring investigations conducted during the RI defined the Fill Area. Twenty-three test pits were dug and thirty-one soil borings were taken. In addition, eighteen soil borings were collected around the perimeter of the Site as part of the OU1 slurry wall design investigation. Based on these data, the following conclusions can be drawn:

- 1) The Fill Area material consists of a variety of construction and demolition (C&D) debris including large blocks of reinforced concrete and rock, steel beams, timber, stumps, scrap metal, fencing, piping, cable, brick, ceramic, concrete masonry block, rock/concrete rubble, etc. Finer-grained materials such as sands, gravels, silts, clays, and sludge-like material were identified mixed within the C&D debris.
- 2) Based on a review of the Test Pit Study Report and photographs of subsurface material, an estimated 60% of the material is C&D debris and the remaining material consists of finer-grained particles mixed with the C&D debris.

Chemical Characteristics

During the RI, numerous chemical constituents were detected in the Fill Area material, including volatile organic compounds (VOCs) such as benzene, tetrachloroethylene and

toluene; semi-volatile organic compounds (SVOCs) (generally polynuclear aromatic hydrocarbons); a small number of pesticides such as aldrin and dieldrin; PCBs; and metals such as copper and lead. For a list of the chemicals of concern for OU2 and their respective maximum concentrations, please see Table 2.

Sludge Area Investigation

An investigation of a portion of the Fill Area was conducted pursuant to the 1997 FFSI Work Plan and was designed to gather data on the nature and extent of contaminated sludge in the vicinity of one of the RI's borings, namely boring B-1 (see Figure 2). This sludge area was later determined to meet the definition of a Hot Spot. Therefore, the terms "sludge area" and "Hot Spot" will be used interchangeably through the remainder of this ROD. The results of the FFSI are presented in the 1997 FFSI Report. In summary, the investigation confirmed the presence of a discrete area of sludge in the eastern portion of the Site with the following characteristics:

- The sludge area is approximately 4,000 square feet in areal extent and consists predominately of sludge material and fine-grained soil with little debris. A surficial layer of fill, approximately 0.5 to 8 feet thick, overlies the sludge and, based on an average thickness of 10 feet, the volume of sludge is approximately 1,480 cubic yards.
- The levels of contaminants for the sludge area include the highest VOC (e.g., tetrachloroethylene at 4,290 parts per million (ppm) and toluene at 3,380 ppm) and PCB (e.g., Arochlor 1242 at >15,000 ppm) concentrations detected anywhere on the SCP property.

The contaminated soils and sludges in the Fill Area are considered to be "principal threat wastes" as the chemicals of concern are found at concentrations that pose a potential significant risk. The risk from the sludges in the Hot Spot Area are significantly higher than the remainder of the Site. In addition, the contaminants demonstrated a potential for off-site migration through surface water runoff, prior to placement of the interim cap.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Use:

The land use at the Site and in the vicinity of the Site is classified as light industrial by the Borough of Carlstadt. The establishments in the immediate vicinity of the Site include a bank, horse stables, warehouses, freight carriers, and service sector industries. There is a residential area located approximately 6,000 feet northwest of the Site.

Groundwater Uses:

The natural water table is found in the shallow aquifer at a depth of approximately two feet below the land surface. The till aquifer consists of the water-bearing unit between the clay and the bedrock. The bedrock aquifer is the most prolific of the three aquifers and is used regionally for potable and industrial purposes. Results of hydrogeologic tests conducted during the RI indicate that the three aquifers are hydraulically connected. Chemical analyses of groundwater from the three aquifers provide further support for this finding. Specifically, chemical data collected during the RI demonstrated that contaminants including chloroform, 1,2-dichloroethane, and vinyl chloride from the shallow aquifer have migrated across the clay layer into the till and bedrock aquifers.

SUMMARY OF SITE RISKS

Human Health Risk Assessment

A baseline human health risk assessment (HHRA) was conducted to evaluate the potential for current and future impacts of site-related contaminants on receptors at the Site. Receptors include: current/future adult on-site and off-site workers; future construction workers; future adolescent trespassers; future off-site workers; and future adult and child off-site residents (see Table 1). Baseline conditions exclude consideration of the current interim remedial action already in place and institutional controls. Under baseline conditions, the human health cancer risks and non-cancer health hazards are unacceptable. The HHRA supports the decision for taking remedial action at the Site.

The site-specific HHRA evaluated both cancer risks and non-cancer health hazards from exposure to contaminants at the Site. In 1990, as part of the RI/FS, EPA conducted a baseline HHRA for the Site to determine the potential current and future effects of contaminants on human health. The toxicity data, exposure assumptions and the risk characterization were updated in July 2000 to reflect more recent toxicity values and exposure assumptions. The calculated cancer risks and non-cancer health hazards presented in this Record of Decision reflect the values presented in the July 2000 update. The conclusions from this revised HHRA do not change the conclusions from the original analysis, i.e., the cancer risks and non-cancer health hazards to the on-site worker and construction worker are unacceptable.

Since the original HHRA was conducted in 1990, there has been an interim remedy constructed which eliminates direct contact with contaminated soil and any potential releases of contaminated soil into the air. The interim remedy also contains contaminated groundwater in the Fill Area. These actions reduce potential exposures and ultimately the cancer risks and non-cancer health hazards to impacted receptors. The updated baseline HHRA of July 2000 focused on health effects from exposure in the absence of this interim remedy by assuming the potential use of the shallow aquifer for drinking water consumption. This approach, therefore, may overestimate cancer risks and non-cancer health hazards based on the current interim remedy already in place to prevent exposure and the fact that groundwater from the shallow aquifer is not currently used for drinking water purposes. In accordance with EPA's policies, based on the classification of the shallow groundwater by the New Jersey Department of Environmental Protection as a potable drinking water source, an assessment of potential use of the shallow groundwater was performed to determine the extent of cancer risks and non-cancer health hazards posed by this groundwater in the absence of remedial action.

Table 2 lists the chemicals of concern evaluated at the Site and frequency of detection. Tables 3 and 4 list the toxicity information for the chemicals of concern; i.e., cancer weight of evidence and cancer slope factor and non-cancer reference doses. Other contaminants of concern at the Site which exceeded EPA's goals for protection, which are one-in-a-million excess cancer risk and non-cancer health hazard index of 1.0, are provided for each receptor and chemical of concern in Tables 5 and 6 respectively. The cancer risks and non-cancer health hazards exceed Superfund's goal for protection at the Site for the trespasser and the worker scenarios. The HHRA found the principal contaminants of concern based on cancer risks and non-cancer health hazards are PCBs.

Cancer risks and non-cancer health hazards were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site in the absence of any remedial actions, including the current interim action. The RME is defined as the highest exposure that is reasonably expected to occur at a Site. EPA also estimated cancer risks and non-cancer health hazards based on central tendency (CT), or average exposures at the Site in the absence of remedial action. The following discussion summarizes the HHRA with respect to the basic steps of the Superfund HHRA process: 1) Data Collection and Analysis, 2) Exposure Assessment, 3) Toxicity Assessment and 4) Risk Characterization.

Data Collection and Analysis

The HHRA updated the 1990 baseline human health risk assessment as part of the RI/FS, using the maximum concentrations of PCBs and other contaminants of concern in soil and groundwater. The HHRA also modeled concentrations of contaminants of concern in air impacting off-site residents and workers. The information on concentrations in the media to which people may be exposed are then combined with information on exposure (see Section 8.1.2) frequency and duration of exposure to calculate cancer risks and non-cancer health hazards.

Chemicals of Concern (Table 1): Total PCBs, a number of metals and several organic compounds in soils and the groundwater directly under the Site were identified as chemicals of concern. They pose the greatest potential cancer risk and non-cancer health hazards to humans at the Site. PCBs were found in Fill Area soils at a maximum concentration of 15,100 mg/kg (ppm) in surface soil, 400 ppm in soils 4 to 6 feet deep, 1,400 ppm in soils 6 to 8 feet deep, and 1,300 ppm. in the deeper Fill Area soils. PCBs were also found in the shallow groundwater at concentrations of 17 ppm. PCBs are a group of 209 individual chlorinated biphenyls compounds (known as congeners) with varying health effects. PCBs are classified by EPA as probable human carcinogens. Some PCBs also have non-cancer health effects, based on animal studies, including reduced birth weight and impacts on the immune system.

VOCs were found in the soils and the groundwater within the shallow watertable aquifer. Maximum total VOC concentrations in the Fill Area soils were 9,000 ppm at 2 to 4 feet deep, 29,200 ppm at 6 to 8 feet deep, and 36,000 ppm at 10 to 12 feet deep. The VOCs of concern and their toxicity information are provided in Table 2 through Table 4. In addition to carcinogenic potential, the chemicals listed in the tables may also cause non-cancer health effects including impacts on the liver and blood at high doses.

Metals found at the Site include arsenic and lead. Arsenic is a known human carcinogen, while lead is classified as a probable human carcinogen. Lead has been shown to cause neurotoxic effects in children.

The concentration of PCBs, and other chemicals identified above, in the environmental media at the point of potential human contact is referred to as the exposure point concentration (EPC). Estimates of the EPC represent the concentration term used in the exposure assessment component of the quantitative risk evaluation (Table 2). EPCs for PCBs and other chemicals are provided for soil and groundwater and estimated concentrations in air for the off-site worker and resident. The EPCs for PCBs in each of these media are generally based upon the maximum concentration from the 1990 sampling and modeled projections of future concentrations in air for the RME and CT individuals and are consistent with Hot Spot analyses.

Exposure Assessment

The exposure assessment evaluates exposure pathways by which people might be exposed to the contaminants of concern in different media (e.g., soil, groundwater, air). Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure.

Conceptual Site Model: Table 1 provides the rationale for inclusion or exclusion of significant exposure pathways. Based on the land-use, the cancer risks and non-cancer health hazards were evaluated for current/future adult on-site workers; future construction workers; future adolescent trespassers; future off-site workers; and future adult and child off-site residents. The HHRA did not evaluate consumption of contaminated groundwater by off-site residents based on the anticipated evaluation of this pathway during OU-3. Cancer risks and non-cancer health hazards to a young child (0-6 years of age) trespassing on the site were not evaluated based on the problems associated with access that would not permit this activity. It should be noted that the nearest off-site resident is currently about 6,000 feet from the Site and the screening level analysis of

this data indicates it is below levels of concern. The potential exposure pathways evaluated included: ingestion and dermal contact with contaminated surface and subsurface soils; inhalation of volatilized contaminants and dust, and ingestion of shallow on-site groundwater.

Exposed Populations: Potentially exposed populations include adults (over 18 years old) and adolescent trespassers (aged 7 to 18 years old). The standard EPA default factors were used for body weight (e.g., 15 kgs for a young child and 70 kgs for an adult) and standard default exposure factors were used for ingestion of soil, dermal contact, exposure frequency, and exposure duration in the calculation of cancer risks and non-cancer health hazards.

Toxicity Assessment

The toxicity assessment determines the types of adverse health effects associated with PCBs and other chemical exposures and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response). Potential health effects for PCBs and other contaminants of concern include the risk of developing cancer over a lifetime. Other non-cancer health effects such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system) are also associated with PCB exposure based on animal studies. Non-cancer health effects associated with other contaminants of concern include effects on the liver, kidney, blood, reductions in birth weight, and effects on other organs.

Sources of Toxicity Information: The HHRA used the current consensus toxicity values for PCBs from EPA's Integrated Risk Information System (IRIS) in 2000 to evaluate the cancer risk and non-cancer health effects of PCBs and other chemicals. IRIS provides the primary database of chemical-specific toxicity information used in Superfund risk assessments. The HHRA used toxicity information for several chemicals from EPA's 1997 Health Effects Assessment Summary Tables where IRIS data was not available.

Cancer: EPA has determined that PCBs cause cancer in animals and probably cause cancer in humans (B2 classification or likely to cause cancer in humans). EPA's cancer slope factors (CSFs) for PCBs represent plausible upper bound estimates, which means that EPA is reasonably confident that the actual cancer risks will not exceed the estimated risks-calculated using the CSF. For ingestion, CSFs of 2 (mg/kg-day)⁻¹ and 1 (mg/kg-day)⁻¹ were used for the RME and CT (average) exposure, respectively. For dermal and inhalation exposures, a CSF of 2 (mg/kg-day)⁻¹ was used with a dermal absorption fraction of 14%, consistent with the IRIS chemical file recommendations. For inhalation, a CSF of 0.4 (mg/kg-day)⁻¹ was used. Table 3 summarizes the cancer toxicity information for the remaining Chemicals of Concern.

Non-Cancer Health Effects: Serious non-cancer health effects have been observed in animals exposed to PCBs. Studies of Rhesus monkeys exposed to PCBs indicate a reduced ability to fight infection and reduced birth weight in offspring exposed to PCBs in utero. Studies of non-cancer health effects, including effects observed in children of mothers who consume PCB-contaminated fish, are being evaluated by EPA as part of the Agency's IRIS process.

The chronic RfD represents an estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including sensitive populations (e.g., children), that is likely to be without an appreciable risk of deleterious effects during a lifetime. Chemical exposures exceeding the RfD do not predict specific disease. For the ingestion pathway, the oral RfD for Aroclor 1254 of 2×10^{-5} mg/kg-day was used for the RME and CT (average) exposures consistent with the reported Aroclor mixtures (i.e., Aroclor 1248, 1254 and 1260). For reported concentrations of Arochlor 1242, the RfD for Aroclor 1016 was used based on similarities in congener patterns. Table 4 summarizes the RfDs, and target organs for the other chemicals of concern.

Risk Characterization

This final step in the HHRA combines the exposure and toxicity information to provide a quantitative assessment of Site cancer risks and non-cancer health hazards. Exposures are evaluated based on the potential risk for developing cancer and the potential for non-cancer health hazards.

Cancer Risks

Cancer risk is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in 10,000 excess cancer risk," or an increased risk of an individual developing cancer of one in 10,000 as a result of exposure to site contaminants under the conditions used in the Exposure Assessment. Under the federal Superfund program, EPA's goal for protection is an excess cancer risk of 10^{-6} (1 in 1,000,000) or less for the Reasonable Maximum Exposure (RME) individual, and acceptable exposures are an individual lifetime excess cancer risk at or below the range of 10^{-4} to 10^{-6} (corresponding to a one in 10,000 to a one in 1,000,000 excess cancer risk). NJDEP's acceptable risk level for carcinogens is 1×10^{-6} .

Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{CSF}$$

where:

Risk = a unit less probability (e. g., 1×10^{-3} of an individual developing cancer)
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
CSF = Cancer Slope Factor, expressed as (mg/kg-day) $^{-1}$

At the SCP Site, cancer risks to the RME individual are above acceptable levels, as shown below in the table titled Point Estimate Cancer Risk Summary (see also Table 5). In addition, cancer risks to the average individual are above EPA's goal for protection of 1 in 1,000,000 and EPA's highest generally accepted risk level of 1 in 10,000 (see also Table 5).

| Point Estimate Cancer Risk Summary | | |
|---|---|---|
| Pathway | CT (Average) Cancer Risk | RME Cancer Risk |
| Ingestion, Inhalation, and Dermal Contact with Surface Soil and Groundwater. Site Worker. | 4.8×10^{-2} (4.8 in 100) | 2.6×10^{-1} (2.6 in 10) |
| Ingestion and Dermal Contact with Subsurface Soil. Construction Worker | Not calculated due to lack of exposure information. | 2.8×10^{-3} (2.8 in 1,000) |
| Ingestion and Dermal Contact with Deep Subsurface Soil. Construction Worker | Not calculated due to lack of exposure information. | 7.9×10^{-6} (7.9 in 1,000,000) |
| Ingestion, Inhalation, and Dermal Exposure to Surface Soil. Adolescent Trespasser. | 4.8×10^{-4} (4.8 in 100,000) | 2.5×10^{-3} (2.5 in 1,000) |

Non-Cancer Health Hazards

The potential for non-cancer health effects is evaluated by comparing an exposure level over a specified time period (e.g., 7 years) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a Hazard Quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single

contaminant is less than the RfD, and that non-carcinogenic health effects from that chemical are unlikely. A Hazard Index (HI) represents the sum of the individual exposure levels for different chemicals with the same target organ or mechanism of toxicity, and different media (e.g., soil, groundwater, air) compared to their corresponding RfDs. The key concept of a non-cancer HI is that a threshold level (measured as an HI of 1) exists below which non-cancer health effects are not expected to occur. Under the federal Superfund program, EPA's goal for protection for non-cancer health hazards is an HI less than 1 for the RME individual.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI/RfD}$$

where: CDI = Chronic daily intake (mg/kg-day)
RfD = Reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic).

At the Site, non-cancer health hazards to the RME individual associated with ingestion of PCBs in soil and groundwater are above acceptable levels, as shown below (see also Table 6). In addition, non-cancer health hazards to the average (CT) individual are above generally acceptable levels of concern (see also Table 6).

| Point Estimate Non-Cancer Risk Summary | | |
|---|---|-------------------|
| Pathway | CT (Avg.) Non-Cancer HI | RME Non-Cancer HI |
| Ingestion, Inhalation, and Dermal Contact with Surface Soil and Groundwater. Site Worker. | 3,102 | 5,042 |
| Ingestion and Dermal Contact with Subsurface Soil. Construction Worker | Not calculated due to lack of exposure information. | 31 |
| Air (Modeled Concentration) Off-Site Worker. | <1 | <1 |
| Ingestion, Inhalation, and Dermal Exposure to Surface Soil. Adolescent Trespasser. | 38 | 234 |

Uncertainty

The process of evaluating human health cancer risks and non-cancer health hazards involves multiple steps. Inherent in each step of the process are uncertainties that ultimately affect the final cancer risk and non-cancer health hazard estimates. Uncertainties may exist in numerous areas. Important sources of uncertainty in the revised HHRA are as follows:

- PCB Toxicity. Toxicity values are inherently uncertain. EPA describes the uncertainty in the cancer toxicity values as extending in both directions (i.e., contributing to possible underestimate or overestimate of cancer potency factors). However, the Cancer Slope Factors (CSFs) were developed to represent plausible upper bound estimates, which means that EPA is reasonably confident that the actual cancer risk will not exceed the estimated risk calculated using the CSF. The CSFs used in

the HHRA were peer- reviewed and supported by a panel of independent scientists and are the most current values recommended by EPA in IRIS.

Non-cancer Toxicity Values for PCBs are also uncertain. The current oral RfDs for Aroclor 1016 and 1254, which were used in the revised HHRA, have uncertainty factors of 100 and 300, respectively. Since these RfDs were developed, a number of recent national and international studies have reported possible associations between developmental and neurotoxic effects in children from prenatal or postnatal exposures to PCBs. In light of these new studies, the current RfDs are currently being evaluated as part of the IRIS process and it would be inappropriate to prejudge the results of the IRIS evaluation at this time.

- Chemical Toxicity Information. Chemical toxicity values (i.e., CSFs, RfDs, and RfCs) were not available for a number of chemicals. Therefore, these chemicals were not quantitatively evaluated in the revised HHRA. This may result in a potential underestimate of cancer risks and non- cancer health hazards for the Site.
- Chemical Data. As described above, the data from the original HHRA were used in the revised HHRA to calculate cancer risks and non-cancer health hazards. Over time, there is a potential that chemical concentrations may be lower or that chemicals may have degraded to other chemicals. This may potentially overestimate or underestimate the cancer risks and non-cancer health hazards depending on the degree of change in concentration and the end-products of degradation.

In addition, the analysis primarily used the maximum concentration found in soil and groundwater consistent with the approach used in the original HHRA and with the Hot Spot analysis conducted. If the 95% Upper Confidence Level (UCL) was used in the calculation of cancer risks and non-cancer health hazards, the resulting assessment may have been lower but still unacceptable.

- Other Exposures. As mentioned earlier, risks associated with off-site ingestion of groundwater and impacts from the Peach Island Creek were not evaluated in the revised HHRA but will be considered in OU-3. Therefore, the cancer risks and non-cancer health hazards may be underestimated.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs). The Remedial Action Objectives for the OU2 Fill Area are to:

- Mitigate the direct contact risk and leaching of contaminants from soil, fill material and sludge into the groundwater;
- Reduce the toxicity and mobility of the Hot Spot contaminants via treatment;
- Provide hydraulic control of the shallow aquifer by maintaining an inward groundwater gradient; and
- Perform remediation in such a manner that may allow site re-use for certain limited commercial purposes.

DESCRIPTION OF REMEDIAL ALTERNATIVES

The remedial alternatives, which were developed during the Feasibility Study, are summarized below. Several of the remedial alternatives include common components. Alternatives SC-3, SC-4 and SC-5 include improving the existing interim containment remedy as a key remedial component. Also, treatment of the Hot Spot is a component of both SC-4 and SC-5.

Because implementation of all of the alternatives, except SC-2, would result in contaminants remaining on the Site at levels above those that would allow for unrestricted use, five-year reviews will be required in perpetuity. In addition, since soils will be left on-site above unrestricted use levels, and above "to be considered" criteria such as the New Jersey soil clean-up levels, all of the alternatives (with the exception of SC-2) would require some form of institutional controls (e.g., deed notice) in addition to the engineering controls described below. Note that the time frames indicated for construction do not include the time for remedial design or the time to procure contracts.

Remedial alternatives for OU2 are presented below.

Alternative SC-1: No Action

| | |
|----------------------------------|------|
| Estimated Capital Cost | \$0 |
| Estimated Annual O&M Cost | \$0 |
| Estimated Present Worth Cost | \$0 |
| Estimated Construction Timeframe | None |

Regulations governing the Superfund program require that the "no action" alternative be evaluated generally to establish a baseline for comparison. Under this alternative, EPA would take no action at the Site to prevent exposure to the soil contamination. The contaminated soil would be left in place without treatment. As the interim remedy was not designed to be permanent, EPA expects that it would eventually fail. This could allow on-site exposure as well as an increased possibility that additional contamination would migrate from the Fill Area.

Alternative SC-2: Excavation/Ex-situ Treatment/Disposal

| | |
|----------------------------------|--------------|
| Estimated Capital Cost | \$91 million |
| Estimated Annual O&M Cost | \$100,000 |
| Estimated Present Worth Cost | \$94 million |
| Estimated Construction Timeframe | 2 years |

Under this alternative, all the contaminated soil, sludge and debris in the entire Fill Area would be removed and sent off-site for treatment or disposal. The mix of large debris and soil found in the Fill Area would be separated by size and composition and stockpiled on-site. Extensive dewatering activities would be conducted prior to and during any excavation activities. Dewatering would include extraction, pretreatment of water on site (to remove sediments) and off site shipping of water to a licensed hazardous wastewater treatment facility. The filtered solids would be characterized and disposed of appropriately. A sheet pile wall would be installed around the entire Fill Area to allow the excavation and removal of the majority of Fill Area debris and soil while protecting the existing slurry wall. During excavation, high levels of VOC and dust emissions would be produced. Dust, VOCs and odor would need to be controlled to protect nearby off-site receptors and the general public. Extensive control of VOC vapor and dust, possibly through use of an enclosed structure over the entire site, as well as air monitoring would need to be provided over the entire site during remedial activities, as would control of run-off due to precipitation. The Fill Area would be backfilled with clean fill and regraded. As all contaminated soils, sludges and debris would be excavated and contaminated groundwater pumped out during the dewatering process, neither the existing nor additional containment measures would be necessary, however long-term monitoring of the shallow groundwater would continue.

Alternative SC-3: Excavation of Hot Spot Area, Capping, and Shallow Groundwater Collection

| | |
|----------------------------------|----------------|
| Estimated Capital Cost | \$13.9 million |
| Estimated Annual O&M Cost | \$180,000 |
| Estimated Present Worth Cost | \$16.7 million |
| Estimated Construction Timeframe | 13 Months |

For this alternative, as well as Alternatives SC-4 and SC-5 (the selected remedy), the key elements of the existing interim remedy would be improved and made permanent. The Hot Spot area sludge would be excavated and sent off-site for treatment (incineration) and

disposal. Dewatering activities would be conducted prior to and during the excavation activity with off-site treatment and disposal of the groundwater. A braced excavation using sheet piles supported by at least two levels of internal bracing would be required to provide a stable excavation and to protect the integrity of the existing slurry wall, which is within 10 feet of the sludge area at some locations. In order to provide a stable excavation and limit emissions, the sludge area would need to be excavated in multiple "cells" rather than a single large excavation. Each cell would be backfilled with imported clean fill before excavating the adjoining cell. During excavation, VOC and dust emissions, and odor would need to be controlled to protect nearby off-site receptors and the general public. To achieve the necessary control, excavation activities would likely need to be completed within a fully enclosed structure so that all VOC and dust emissions could be collected and treated using appropriate technologies such as catalytic oxidation or phase activated carbon adsorption prior to discharging to the atmosphere. The cap would consist of a 2-foot thick "double containment" cover system, which would be constructed over the entire area currently circumscribed by the existing slurry wall, and over the area between the slurry wall and the sheet piling along Peach Island Creek (see Figure 3). The cover system would provide flexibility for the potential end-use of the Site for commercial purposes.

In order to maintain hydraulic control within the existing slurry wall, the existing, interim groundwater recovery system, which consists of above ground piping and seven wells screened in the Fill Area, which discharges to a 10,000 gallon on-site holding tank, would be improved. The improvements would include the installation of new extraction wells along the perimeter of the Site, construction of underground clean utility corridors for the wells, and piping and electrical system to allow more flexibility for future uses of the Site. A geotextile would be placed within the utility corridor to separate Fill Area soils from clean soils within the utility corridors. The extracted groundwater would either be collected in the existing 10,000 gallon above-ground tank for disposal via tanker truck at a commercial facility, or pumped, via sewer connection, to the Bergen County Publicly Owned Treatment Works (POTW) for treatment.

Currently, a sheet pile wall along Peach Island Creek protects the slurry wall along the riparian side of the Fill Area. Improvements would be made to the sheet pile wall which could include the installation of slope stabilization material such as rip-rap. Soil samples will be collected between the slurry wall and the sheet pile wall, especially the area adjacent to the sludge area, during the remedial design or remedial action phase of OU2. The existing slurry wall would remain in place.

The slurry wall includes a double containment system consisting of a soil-bentonite slurry barrier and a geomembrane barrier. The slurry wall is keyed into the natural clay layer underlying the Fill Area. For this alternative, as well as Alternatives SC-4 and SC-5, the effectiveness of the slurry wall will be evaluated during the design phase of the clean-up. In addition, after implementation of the design, long term monitoring will continue through the use of shallow groundwater wells outside the slurry wall.

Alternative SC-4 In-Situ Thermal Desorption, Capping, and Shallow Groundwater Collection

| | |
|----------------------------------|---------------|
| Estimated Capital Cost | \$4.7 million |
| Estimated Annual O&M Cost | \$180,000 |
| Estimated Present Worth Cost | \$7.5 million |
| Estimated Construction Timeframe | 1 year |

In- situ thermal desorption treatment of the Hot Spot Area could be achieved via installation of thermal wells, consisting of a perforated outer steel casing and interior heating element, in a closely-spaced pattern throughout the area. A heat resistant silica blanket would be placed over the area forming a seal to minimize losses of VOCs and steam, as well as to reduce intrusion of atmospheric air. The wells and an approximately 6-inch wide concentric halo would be heated to 1,400°F. Heat propagating throughout the area would first vaporize moisture, and then increase sludge temperatures to around 450°F (sufficiently high to cause PCBs to desorb from the soil). A modest vacuum (3 to 5 inches of water) would be applied to each well in the system to remove vapors. Extracted vapors

would be treated by an indirect fired thermal oxidizer at ground surface followed by a heat exchanger and a vapor phase activated carbon (VPAC) system.

A description of the capping and groundwater collection that would be performed for this alternative can be found in the description of Alternative SC-3.

Alternative SC-5: Air Stripping, Capping, Solidification/Stabilization and Shallow Groundwater Collection.

| | |
|----------------------------------|---------------|
| Estimated Capital Cost | \$4.7 million |
| Estimated Annual O&M Cost | \$180,000 |
| Estimated Present Worth Cost | \$7.5 million |
| Estimated Construction Timeframe | One Year |

For this alternative, in-situ (i.e., in place) treatment followed by solidification/stabilization of the Hot Spot Area would be performed.

The Hot Spot Area would first be treated, in-situ, via air stripping, which in this case would be effected by aerating the Hot Spot area with augers or paddles. During operation of the selected air stripping method, small shrouds will be placed directly over the augers or paddles and negative pressure would be maintained within the shroud to capture the VOCs released during mixing. VOCs released from the Hot Spot Material would be treated using vapor phase activated carbon, a catalytic oxidizer or other appropriate technologies. Cement and lime, which the treatability studies showed to be effective in stabilizing the PCBs and SVOCs, would be used as the solidification and stabilization agent. Addition of the cement and lime would increase the volume of the Hot Spot area by about 10%. Treatment is expected to extend at least two feet below the natural ground surface, which would be approximately 10-18 feet below existing ground surface.

This alternative would also include improving and making permanent the key elements of the existing interim remedy. A description of the improvements such as capping and groundwater collection that would be performed for this alternative can be found in the description of Alternative SC-3.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considers the factors set out in Section 121 of CERCLA, 42 U.S.C. §9261, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR § 300.430(e) (9) and Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01. The detailed analysis consists of an assessment of the alternatives against each of nine evaluation criteria and comparative analysis focusing upon the relative performance of each alternative against those criteria.

Threshold Criteria - *The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

1. Overall Protection of Human Health and the Environment

This criteria addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative SC-1, the no action alternative, is not protective of human health and the environment because it does not eliminate, reduce or control risks posed by the site through treatment of soil contaminants, engineering controls, and/or institutional controls.

Alternative SC-2 would remove for disposal or treatment the contaminated material in the entire Fill Area, thereby providing the most protection to property owners/occupants from

future exposure to contaminated soils.

Alternative SC-3 would remove the most contaminated portion of the Fill Area (i.e., the Hot-Spot) and include a cap, other containment measures, as well as institutional controls and, therefore, provides adequate protection to property owners/occupants from future exposure to contaminated soils.

Alternatives SC-4 and SC-5 would treat, through thermal desorption and air stripping/stabilization, respectively, the most contaminated portion of the Fill Area (i.e., the Hot-Spot) and, like Alternative SC-3, include a cap, other containment measures, and institutional controls. Therefore, these alternatives would provide adequate protection to property owners/occupants from future exposure to contaminated soils. Also, Alternatives SC-3, SC-4 and SC-5 would all prevent the spread of contaminants outside the Site through the use of the existing slurry wall, and an improved groundwater collection system.

2. Compliance with applicable or relevant and appropriate requirements (ARARs)

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, a pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only the State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those clean-up standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of Federal and State environmental statutes or provides a basis for invoking a waiver.

Actions taken at any Superfund site must meet all ARARs of federal and state law, or provide grounds for invoking a waiver of these requirements. These include chemical-specific, location-specific and action-specific ARARs.

Soil

There are no chemical-specific ARARs for the contaminated soils. Any soil remediation goals would therefore be risk-based.

Alternative SC-1. Because ARARs apply to actions taken, they are not applicable to the no action alternative.

Alternative SC-2. There are no chemical-specific ARARs for the contaminated soils. If Alternative SC-2 were selected, risk-based cleanup goals for the Fill Area would be developed and the New Jersey Soil Cleanup Criteria (NJSCC) would be taken into consideration. There are three types of NJSCC: Residential Direct Contact (RDCSCC); Non-Residential Direct Contact (NRDCSCC); and Impact to Groundwater (IGWSCC). Since the Site is located in a non-residential/commercial area, the more stringent of the NRDCSCC or the IGWSCC would be considered in the development of risk-based soil cleanup goals.

Alternatives SC-3, SC-4 and SC-5 would, through containment, monitoring and institutional controls, mitigate the potential risks from the Site and therefore comply with NJSCC.

Alternatives SC-2, SC-3, SC-4 and SC-5 would substantively comply with the New Jersey Technical Requirements for Site Remediation, N.J.A.C. 7:26E et. seq., the New Jersey Brownfield and Contaminated Site Remediation Act, N.J.A.C. 58:10B and any relevant local requirements including the Hackensack Meadowlands Development Commission regulations.

The Resource Conservation and Recovery Act (RCRA) is a federal law that mandates procedures for treating, transporting, storing and disposing of hazardous substances. All portions of RCRA that were applicable or relevant and appropriate to the proposed remedy for the Site would be met by Alternatives SC-2, SC-3, SC-4 and SC-5.

Groundwater

Alternatives SC-3, SC-4 and SC-5 require that groundwater within the Fill Area be pumped and sent off-site, which in combination with the slurry wall and natural clay layer would prevent the spread of contaminants to the surrounding areas or to surface water thereby preventing any direct exposure to contaminated water. In addition, since the Groundwater Quality Standards will not be met within the Fill Area, a Classification Exception Area (CEA) would need to be established for all of the alternatives, except possibly for SC-2.

Primary Balancing Criteria - *The next five criteria, criteria 3 through 7, are known as "primary balancing criteria. These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given the site-specific data and conditions.*

3. Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.

Alternative SC-1 would provide no long-term effectiveness and permanence in the prevention of direct contact to or spread of Fill Area contamination.

Alternative SC-2 would provide the greatest long-term effectiveness without requiring long-term controls as soils above risk-based cleanup levels would be removed from the Site.

Alternatives SC 3, SC-4 and SC-5 are all effective in the long-term, although to a lesser degree than SC-2, as they would reduce potential risks due to ingestion and dermal contact pathways and minimize any potential of contamination impacting groundwater outside the Fill Area. However the cap, slurry wall, groundwater pumping system and monitoring wells would require regular inspection and maintenance to ensure the integrity of the remedy over the long-term.

4. Reduction of Toxicity, Mobility or Volume of Contaminants Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative SC-1 would not reduce the toxicity, mobility or volume of contaminated soil.

Alternative SC-2 would reduce toxicity, mobility and volume of contaminants on-site through removal and treatment or disposal of the contaminants off-site.

Alternative SC-3 would reduce the toxicity, mobility and volume of the contaminants in the Fill Area through direct removal and treatment of the entire Hot Spot Area, and would reduce mobility over the whole Fill Area through installation of a permanent cap.

Alternative SC-4 and SC-5 would reduce the concentration, as well as the toxicity and mobility, of a large percentage of the contaminants in the Fill Area through treatment of the highly-contaminated Hot Spot Area. SC-5 would also stabilize any remaining contamination in the Hot Spot Area, but would increase the volume of the Hot Spot Area by approximately 10 percent through the addition of stabilizing materials. Like Alternative SC-3, Alternative SC-4 and SC-5 would also reduce mobility over the whole Fill Area through installation of a permanent cap.

5. Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative SC-1, the No Action alternative, poses no short-term risks and can be implemented immediately.

Alternative SC-2 has the greatest short-term risk. It would require the most excavation, and would also require extensive stockpiling and separation of the on-site soil and debris. Even with engineering methods such as the construction of a negative pressure enclosed structure over the entire site, controlling 99% of VOC releases and dust emissions (as required) would be extremely difficult during excavation. Implementation of Alternative SC-2 would require additional truck traffic in the industrial area around the Site, which would have to be coordinated with local officials so as to lessen the impacts to normal area traffic. And as in Alternative SC-3 below, due to the nature of the contamination, few facilities can handle a significant portion of the site waste, therefore the progress of the remediation could be impeded. The estimated timeframe for implementation is twice as long (i.e., two years) as Alternatives SC-3, SC-4 and SC-5.

Alternative SC-3 may require construction of a large tent over a portion of the Site to ensure that the high concentration of VOCs that exist on-site are not released into the air during the excavation of the Hot Spot area. Also, significant effort would be needed to prevent escape of VOCs during the excavation and there would be added risk associated with transporting the sludge to the nearest available treatment and disposal facilities. Additionally, the only facilities that can handle mixed waste of the sort found in the Hot Spot area, have indicated that they would have to impose daily limits on the amount of sludge they could accept in order to prevent emissions violations. Therefore, limitations on the rate of acceptance of the sludge at a disposal area could significantly impede the progress of this remedial action. Implementation of Alternative SC-3 would require additional truck traffic in the industrial area around the Site, which would have to be coordinated with local officials so as to lessen the impacts to normal area traffic.

Alternative SC-4 would require the installation and operation of high temperature thermal elements and would allow for the potential of VOC and Hydrogen Chloride (HCl) releases. There are a number of uncertainties related to the technical practicability of this alternative. Thermally treating high levels of total organic carbon in the Hot Spot area (from oil and grease) would likely cause ash and coke build-up around the wells. This build-up could make the wells completely inoperable or inefficient in the extraction of vapors. The treatment temperatures would be high enough to allow vaporization of metals which may damage the efficiency of the thermal oxidizer. The effectiveness of this action is also uncertain due to the very high water content in this area.

Alternative SC-5 would require control of VOC releases during the air stripping remedial action through the use of small shrouds. This would require close monitoring to ensure short-term effectiveness and safety. Alternatives SC-3, SC-4 and SC-5 would use the capping/slurry-wall and groundwater collection methods to contain the wastes in the Fill

Area. These methods have been shown to be effective during eight years of operation of the interim remedy.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative SC-1 requires no implementation.

Alternative SC-2 would require surmounting many technical and potential human exposure problems. Approximately 99% of the VOC and dust emissions would have to be controlled in order to protect against a potential "worst-case" off-site human exposure scenario. VOC and dust control would require that excavation and material handling activities for the entire Site be conducted within an enclosed structure. Emissions from the enclosure would require treatment prior to being discharged to the atmosphere. In addition, the large and varied amount of soil and debris found in the Fill Area, including wood, plastic, metal, cement, saturated and unsaturated soils etc., would require extensive manual labor to separate and would require creation of a large number of on-site stock piles in a relatively small area.

The increased traffic, possible street closures, and the need to stockpile debris near the site would require coordination with local and state agencies. State and local agency coordination would also be required for relevant permits.

Alternatives SC-3, SC-4 and SC-5 would improve and make permanent the existing interim remedy as described in SC-3 and referenced in SC-4 and SC-5. A new slurry wall would not need to be constructed, however, a new cap, stream bank stabilization along Peach Island Creek, piping for groundwater collection, and additional monitoring wells would be constructed or installed. The methods for this work are well known and equipment is readily available.

Alternative SC-3 would entail significant challenges relating to the removal of the Hot Spot. Construction risks, due to the instability of the Hot Spot, and the risk of contaminant migration during construction activities are significant. Also, significant effort would be needed to prevent escape of VOCs during the excavation and there would be added risk associated with transporting the sludge to the nearest available treatment and disposal facilities. Additionally, limitations on the rate of acceptance of the sludge at a disposal area, as described in the Short Term Effectiveness section of this ROD, would significantly impede the progress of this remedial action.

Treatment of Hot Spot Materials by Thermal Desorption under Alternative SC-4 would be problematic due to the high moisture content (between 85% and 100% saturation) of the sludge. This would likely lead to extended treatment times since virtually all moisture must be vaporized before sludge temperatures increase to allow contaminant desorption. Calculations indicate that large quantities of HCl would be generated, giving rise to concerns that HCl would react with metals forming more soluble compounds (salts) that would be more mobile than the metal compounds which currently exist at the Site. In addition, the high concentrations of petroleum-based oils would likely cause repeated fouling of the thermal system, which in turn would reduce the overall efficiency of the wells to extract vapors and control potential releases at the surface.

The Alternative SC-5 treatment processes using air stripping and stabilization/solidification for Hot Spot materials are relatively well known technologies. This treatment proved effective during treatability studies using sludge from the Hot Spot Area, where concentrations of VOCs were reduced by 90% and mobilization of PCBs and VOCs were reduced by over 95%. Due to the fact that only small areas will be treated at a time, and that bulk excavation will not occur, the potential of VOC releases during aeration and

the spread of the contaminants during implementation of this alternative is far less than for either Alternative SC-3 or SC-2. Nevertheless, these risks would need to be addressed during the remedial action.

7. Cost

Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs.

Alternative SC-1 has a cost of \$0

The estimated present worth cost of Alternative SC-2 (\$94 million) is significantly more than Alternative SC-3 (\$16.7 million). Alternative SC-3 is approximately twice the cost of either Alternative SC-4 or SC-5 (\$7.5 million). The costs for the latter two alternatives are comparable, as are the implementation time frames.

Modifying Criteria - *The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred remedy and cause another response measure to be considered.*

8. State/Support Agency Acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

NJDEP concurs with the selected remedy, Alternative SC-5, however if Alternative SC-5 fails to meet engineering criteria with regards to stabilization, NJDEP recommends and EPA agrees that Alternative SC-3 be used as the alternate remedy.

9. Community Acceptance

Summarizes the public's general response to the proposed alternative and other information described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

During the public comment period, the community expressed its support for Alternatives SC-3 and SC-5. The community did not consider Alternative SC-1 to be adequately protective, and felt that Alternatives SC-2 and SC-4 were not feasible. The attached Responsiveness Summary summarizes the community comments on the Proposed Plan.

PRINCIPAL THREAT WASTE

The action chosen in the ROD addresses the Hot Spot area material which is the high-level or principal threat waste associated with OU2 at the Site.

SELECTED REMEDY

Based upon consideration of the results of the site investigation, the requirements of CERCLA, the detailed analysis of the response measures, and public comments, EPA has determined that Alternative SC-5 is the appropriate remedy for addressing the Fill Area. The selected alternative, Alternative SC-5, for cleanup of the OU2 soils consists of the following components.

- Air stripping of the Hot Spot area until levels of VOCs are reduced to whichever is more stringent: 90% lower than current levels, the average VOC levels in the Fill Area outside the Hot Spot (i.e., 1,000 ppm) or to a level where interference with stabilization will not occur. VOCs released during treatment will be collected and treated on site, or adsorbed to assure no negative impacts to the surrounding

community.

- Soil stabilization of the Hot Spot using cement and lime, so that the Hot Spot is solidified to meet an unconfined strength of at least 15 pounds per square inch and at least a 90% reduction in leachability based on Synthetic Precipitation Leaching Procedure (SPLP) analysis. VOCs released during treatment will be treated on site, or adsorbed to assure no negative impacts to the surrounding community.
- Installation of a landfill cap over the entire Fill Area. The cap will consist of a 2-foot thick "double containment" cover system, which will be constructed over the entire area currently circumscribed by the existing slurry wall.
- Improvement of the existing, interim groundwater recovery system (as described in Alternative SC-3), which consists of above ground piping, as well as wells screened in the Fill Area. The improvements will include the installation of new extraction wells along the perimeter of the Site, construction of underground clean utility corridors for the wells, and piping and electrical system to allow more flexibility for future uses of the Site. The extracted groundwater will either be collected in the existing above-ground tank for disposal, or pumped, via sewer connection, to the Bergen County Publicly Owned Treatment Works (POTW) for treatment.
- The existing sheet pile wall along Peach Island Creek, which protects the slurry wall along the riparian side of the Fill Area, will be improved and upgraded.

While EPA believes the Hot Spot treatment portion of the Selected Remedy will be effective, as in any remedial action, if appropriate performance standards for treatment, solidification and containment are not met, then removal of the Hot Spot, as described in Alternative SC-3 will be performed.

The Selected Alternative was chosen over the other alternatives since it is readily implementable, and it is expected to achieve reduction in the VOC concentration while also stabilizing and containing the inorganic and PCB contamination in the most highly-contaminated area (i.e., the Hot Spot) of the Fill Area. In addition, containment, which is the key element of the Selected Alternative, improves on the interim remedy to make it viable on a long-term basis to reduce the potential of risk from contaminants that will remain in the Fill Area. The containment measures implemented as part of the interim remedy (OU1) have proved effective during the remedy's entire eight years of operation. The Selected Alternative greatly reduces the potential of risk to human health and the environment through treatment of the most highly-contaminated area, while improving on the existing effective remedy for soils and groundwater currently in place.

Based on the information available at this time, EPA and NJDEP believe the Selected Alternative is protective of human health and the environment, is cost effective, and will use permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it will treat the portion of the source material constituting principal threats, the Selected Alternative meets the statutory preference for the selection of a remedy that involves treatment as a principal element.

STATUTORY DETERMINATIONS

As previously noted, Section 121(b)(1) of CERCLA mandates that a remedial action must be protective of human health and the environment, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at the site. Section 121(d) of CERCLA further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA. As discussed below, EPA has determined that the selected remedy meets the requirements of Section 121 of CERCLA.

Protection of Human Health and the Environment

The Selected Remedy, Alternative SC-5, will adequately protect human health and the environment through in-situ treatment, stabilization, off-site treatment of collected contaminated groundwater and containment measures, including a landfill cap as well as institutional controls. The Selected Remedy will prevent all significant direct-contact cancer risks and non-cancer hazards to human health and the environment associated with the Fill Area. In addition, this action will reduce the potential for the Fill Area to act as a source of contamination to the underlying groundwater. This action will result in the continued reduction of exposure levels to acceptable risk levels within EPA's generally acceptable risk range of 10⁻⁴ to 10⁻⁶ for carcinogens and an HI below 1 for non-carcinogens. Implementation of the Selected Remedy will not pose unacceptable short-term cancer risks, non-cancer health hazards or adverse cross-media impacts.

Compliance with ARARs

At the completion of the response action, the Selected Remedy will have complied with all applicable ARARs, including, but not limited to:

Action-Specific ARARs:

- National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).
- NJ Administrative Code (NJAC) 7:26E et seq, New Jersey Technical Requirements for Site Remediation
Note: The substantive requirements of the Technical Requirements may qualify as ARARs where they are more stringent than federal requirements and where they do not conflict with the requirements under CERCLA. This distinction is relevant, for example, where the Technical Requirements require deliverables inconsistent with the NCP or where they require permits that conflict with provisions of CERCLA or the NCP.
- National Ambient Air Quality Standards (40 CFR Part 50).
- RCRA - Land Disposal Restrictions (40 CFR Part 268)
- RCRA - Generator Requirements for Manifesting Waste for Off-site Disposal (40 CFR Part 263).
- RCRA - Transporter Requirements for Off-Site Disposal (40 CFR Part 270).
- RCRA - Standards for Owners/Operators of Permitted Hazardous Waste Facilities (40 CFR Part 264)
- DOT - Rules for Hazardous Materials Transport (49 CFR Parts 107, 171, 173).

Chemical-Specific ARARs:

- None applicable.

Location-Specific ARARs:

- None applicable.

Cost-Effectiveness

The Selected Remedy is cost effective and represents a reasonable value for the money to be spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness). Overall

effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy is \$7,500,000, which is the same as the estimated present worth cost of Alternative SC-4. Alternative SC-4 and the Selected Remedy are the least expensive of the remedial Alternatives considered for this Site.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable.

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and considering State and community acceptance.

The Selected Remedy satisfies the criteria for long-term effectiveness and permanence by preventing the risks due to ingestion and thermal exposure pathways by installation of a permanent cap, and also treatment via air stripping and stabilization of the most contaminated source area. The Selected Remedy presents less short-term risks than any other alternative as the treatment technique used would be the least likely to allow uncontrolled release of volatiles to the surrounding community.

Preference for Treatment as a Principal Element

By utilizing treatment on the most highly- contaminated areas within the Fill Area, the Selected Remedy satisfies the statutory preference for remedies that employ treatment as a principal element.

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on the Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the SCP Site was released for public comment on August 15, 2001 and the public comment period ran from that date through October 25, 2001.

All written and verbal comments submitted during the public comment period were reviewed by EPA. Upon review of these comments, EPA has determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary.

APPENDIX I
FIGURES



QUADRANGLE LOCATION

REFERENCE

1.) USGS 7.5 MINUTE WEHAWKEN QUADRANGLE,
 NEW JERSEY - NEW YORK, DATE 1987, PHOTOREVISED
 1981.



SITE LOCATION MAP

APPENDIX II
FIGURES

| Table 1 | | | | |
|-------------------------------|-------------------------------|-------------|--------------|-------------------------------|
| Exposure Point | Chemicals of Concern | Max. | Units | Frequency of Detection |
| Surface Soil (0 to 2 ft). | Tetrachloroethylene | 4,290 | mg/kg | 12/17 |
| | Trichloroethylene | 2,060 | mg/kg | 12/17 |
| | Benzo-a-anthracene | 4.54 | mg/kg | 5/17 |
| | Benzo-a-pyrene | 9.39 | mg/kg | 9/17 |
| | Benzo-b-fluoranthene | 17.8 | mg/kg | 6/17 |
| | Di-benzo-ah-anthracene | 2.4 | mg/kg | 3/17 |
| | Indeno (1,2,3-cd)pyrene | 12.2 | mg/kg | 6/17 |
| | N-nitroso-diphenylamine | 2.96 | mg/kg | 3/17 |
| | 1,1-dichloroethylene | 0.18 | mg/kg | 2/17 |
| | Aldrin | 67.0 | mg/kg | 3/17 |
| | Dieldrin | 67.0 | mg/kg | 5/17 |
| | Arsenic | 60.0 | mg/kg | 14/17 |
| | 1,2-dichloroethene | 10.2 | mg/kg | 4/17 |
| | Aroclor 1242 | 1,500.0 | mg/kg | 11/17 |
| | Aroclor 1248 | 23.0 | mg/kg | 4/17 |
| | Aroclor 1260 | 49.0 | mg/kg | 2/17 |
| Aroclor 1264 | 12.0 | mg/kg | 3/17 | |
| Subsurface Soil (5 to 6 feet) | 1,2-dichloroethane | 290.0 | mg/kg | 4/17 |
| | Tetrachloroethylene | 1,690.0 | mg/kg | 12/17 |
| | 1,2-Dichloro-ethylene (trans) | 512 | mg/kg | 6/17 |
| | Benzdine | 244.0 | mg/kg | 1/17 |
| | Benzo-a-anthracene | 84.2 | mg/kg | 6/17 |
| | Benzo-a-pyrene | 108.0 | mg/kg | 7/17 |
| | Benzo(b) fluoroanthene | 164.0 | mg/kg | 6/17 |
| | Indeno(1,2,3-cd) pyrene | 86.9 | mg/kg | 4/16 |
| | Aroclor 1242 | 360.0 | mg/kg | 12/17 |
| Aroclor 1248 | 9.7 | mg/kg | 2/17 | |
| Aroclor 1254 | 3.5 | mg/kg | 3/16 | |

| | | | | |
|-----------------------------|----------------------------|--------|-------|-------|
| | Aroclor 1260 | 10.0 | mg/kg | 2/17 |
| | Arsenic | 62.0 | mg/kg | 15/17 |
| Subsurface Soil (Deep) | Tetrachloro- ethylene | 917.0 | mg/kg | 7/17 |
| | Vinyl chloride | 11.78 | mg/kg | 1/17 |
| | Benzo(a) pyrene | 4.74 | mg/kg | 10/17 |
| | Aroclor 1242 | 5.4 | mg/kg | 11/17 |
| | Aroclor 1248 | 2.6 | mg/kg | 3/17 |
| | Aroclor 1264 | 2.2 | mg/kg | 3/17 |
| | Arsenic | 18.0 | mg/kg | 10/17 |
| Subsurface Soil (Very Deep) | Tetrachloro-ethylene | 636.0 | mg/kg | 14/16 |
| Aqueous | Benzene | 7.3 | mg/l | 10/14 |
| | Chloroform | 614 | mg/l | 4/14 |
| | 1,2-dichloro-ethane | 473.0 | mg/l | 4/14 |
| | 1,1-dichloro-ethylene | 0.032 | mg/l | 1/14 |
| | 1,1,2,2-tetra chloroethane | 7.4 | mg/l | 4/14 |
| | Tetrachloro-ethylene | 24.6 | mg/l | 3/14 |
| | Methylene chloride | 200.0 | mg/l | 10/14 |
| | Trichloroethylene | 161.0 | Mg/l | 8/14 |
| | Bis-2-ethylhexyl phthalate | 0.68 | Mg/l | 6/14 |
| | Vinyl chloride | 7.3 | Mg/l | 8/14 |
| | Isophorone | 8.46 | Mg/l | 6/14 |
| | DDT and compounds | 0.0017 | mg/l | 3/14 |
| | Total PCBs | 17.0 | Mg/l | 6/14 |
| | Arsenic | 3.1 | Mg/l | 10/14 |

Table 2 Exposure Point Concentrations for Chemicals of Concern.

| Exposure Point | Chemical of Concern | Concentration Detected | | Units | Frequency of Detection | Exposure Point Concentration | Exposure Point Concentration Units | Statistical Measure |
|---------------------------|-------------------------|------------------------|-------|-------|------------------------|------------------------------|------------------------------------|---------------------|
| | | Min. | Max. | | | | | |
| Surface Soil (0 to 2 ft). | Tetrachloroethylene | | 4,290 | mg/kg | 12/17 | 4,290 | mg/kg | Maximum |
| | Trichloroethylene | | 2,060 | mg/kg | 12/17 | 2,060 | mg/kg | Maximum |
| | Benzo-a-anthracene | | 4.54 | mg/kg | 5/17 | 4.54 | mg/kg | Maximum |
| | Benzo-a-pyrene | | 9.39 | mg/kg | 9/17 | 9.39 | mg/kg | Maximum |
| | Benzo-b-fluoranthene | | 17.8 | mg/kg | 6/17 | 17.8 | mg/kg | Maximum |
| | Di-benzo-ah-anthracene | | 2.4 | mg/kg | 3/17 | 2.4 | mg/kg | Maximum |
| | Indeno(1,2,3-cd)pyrene | | 12.2 | mg/kg | 6/17 | 12.2 | mg/kg | Maximum |
| | N-nitroso-diphenylamine | | 2.96 | mg/kg | 3/17 | 2.96 | mg/kg | Maximum |
| | 1,1-dichloroethylene | | 0.182 | mg/kg | 2/17 | 0.182 | mg/kg | Maximum |
| | Aldrin | | 67.0 | mg/kg | 3/17 | 67.0 | mg/kg | Maximum |
| | Dieldrin | | 67.0 | mg/kg | 5/17 | 67.0 | mg/kg | Maximum |
| | Arsenic | | 60.0 | mg/kg | 14/17 | 60.0 | mg/kg | Maximum |

| | | | | | | | | |
|-------------------------------|-------------------------------|--|---------|-------|-------|---------|-------|---------|
| | 1,2-dichloroethene | | 10.2 | mg/kg | 4/17 | 10.2 | mg/kg | Maximum |
| | Aroclor 1242 | | 1,500.0 | mg/kg | 11/17 | 1,500.0 | mg/kg | Maximum |
| | Aroclor 1248 | | 23.0 | mg/kg | 4/17 | 23.0 | mg/kg | Maximum |
| | Aroclor 1260 | | 49.0 | mg/kg | 2/17 | 49.0 | mg/kg | Maximum |
| | Aroclor 1264 | | 12.0 | mg/kg | 3/17 | 12.0 | mg/kg | Maximum |
| Subsurface Soil (5 to 6 feet) | 1,2-dichloroethane | | 290.0 | mg/kg | 4/17 | 290.0 | mg/kg | Maximum |
| | Tetrachloro ethylene | | 1,690.0 | mg/kg | 12/17 | 1,690.0 | mg/kg | Maximum |
| | 1,2-Dichloro-ethylene (trans) | | 512 | mg/kg | 6/17 | 512 | mg/kg | Maximum |
| | Benzidine | | 244.0 | mg/kg | 1/17 | 244.0 | mg/kg | Maximum |
| | Benzo-a-anthracene | | 84.2 | mg/kg | 6/17 | 84.2 | mg/kg | Maximum |
| | Benzo-a-pyrene | | 108.0 | mg/kg | 7/17 | 108.0 | mg/kg | Maximum |
| | Benzo(b)fluoroanthene | | 164.0 | mg/kg | 6/17 | 164.0 | mg/kg | Maximum |
| | Indeno(1,2,3-cd)pyrene | | 86.9 | mg/kg | 4/16 | 86.9 | mg/kg | Maximum |
| | Aroclor 1242 | | 360.0 | mg/kg | 12/17 | 360.0 | mg/kg | Maximum |
| | Arclor 1248 | | 9.7 | mg/kg | 2/17 | 9.7 | mg/kg | Maximum |

| | | | | | | | | |
|-----------------------------|----------------------------|--|-------|-------|-------|-------|-------|---------|
| | Arcolor 1254 | | 3.5 | mg/kg | 3/16 | 3.5 | mg/kg | Maximum |
| | Aroclor 1260 | | 10.0 | mg/kg | 2/17 | 10.0 | mg/kg | Maximum |
| | Arsenic | | 62.0 | mg/kg | 15/17 | 62.0 | mg/kg | Maximum |
| Subsurface Soil (Deep) | Tetrachloro-ethylene | | 917.0 | mg/kg | 7/17 | 917.0 | mg/kg | Maximum |
| | Vinyl chloride | | 11.78 | mg/kg | 1/17 | 11.78 | mg/kg | Maximum |
| | Benzo(a) pyrene | | 4.74 | mg/kg | 10/17 | 4.74 | mg/kg | Maximum |
| | Aroclor 1242 | | 5.4 | mg/kg | 11/17 | 5.4 | mg/kg | Maximum |
| | Aroclor 1248 | | 2.6 | mg/kg | 3/17 | 2.6 | mg/kg | Maximum |
| | Aroclor 1264 | | 2.2 | mg/kg | 3/17 | 2.2 | mg/kg | Maximum |
| | Arsenic | | 18.0 | mg/kg | 10/17 | 18.0 | mg/kg | Maximum |
| Subsurface Soil (Very Deep) | Tetrachloro-ethylene | | 636.0 | mg/kg | 14/16 | 636.0 | mg/kg | Maximum |
| Groundwater | Benzene | | 7.3 | mg/l | 10/14 | 7.3 | mg/l | Maximum |
| | Chloroform | | 614 | mg/l | 4/14 | 614.0 | mg/l | Maximum |
| | 1,2-dichloro-ethane | | 473.0 | mg/l | 4/14 | 473.0 | mg/l | Maximum |
| | 1,1-dichloro-ethylene | | 0.032 | mg/l | 1/14 | 0.032 | mg/l | Maximum |
| | 1,1,2,2-tetra chloroethane | | 7.4 | mg/l | 4/14 | 7.4 | mg/l | Maximum |

| | | | | | | | | |
|--|----------------------------|--|--------|------|-------|--------|------|---------|
| | Tetrachloro-ethylene | | 24.6 | mg/l | 3/14 | 24.6 | mg/l | Maximum |
| | Methylene chloride | | 200.0 | mg/l | 10/14 | 200.0 | mg/l | Maximum |
| | Trichloroethylene | | 161.0 | Mg/l | 8/14 | 161.0 | Mg/l | Maximum |
| | Bis-2-ethylhexyl phthalate | | 0.68 | Mg/l | 6/14 | 0.68 | Mg/l | Maximum |
| | Vinyl chloride | | 7.3 | Mg/l | 8/14 | 7.3 | Mg/l | Maximum |
| | Isophorone | | 8.46 | Mg/l | 6/14 | 8.46 | Mg/l | Maximum |
| | DDT and compounds | | 0.0017 | mg/l | 3/14 | 0.0017 | mg/l | Maximum |
| | Total PCBs | | 17.0 | Mg/l | 6/14 | 17.0 | Mg/l | maximum |
| | Arsenic | | 3.1 | Mg/l | 10/14 | 3.1 | Mg/l | Maximum |

Table 3 Conceptual Site Model for SCP Site for Pathways That Were Screened Out or Exhibited Unacceptable Cancer Risks and Non-Cancer Health Hazards..

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | On-Site/ Off-Site | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|--------------------|--------------|-----------------|-----------------------|-----------------------|--------------|----------------------|-------------------|------------------|--|
| | | | | | | | | | |
| Current/ Future | Soil | Surface Soil | Surface Soil | Site Worker | Adult | Ingestion Dermal | On-Site | Quant | Current on-site workers may be exposed to contaminated materials |
| | | | Particulates | Site Worker | Adult | Inhalation | On-Site | Quant. | Current on-site workers may be exposed to wind blown particulates on site if the interim cap is not adequately maintained. |
| | | | Volatiles | Site Worker | Adult | Inhalation | On-Site | Quant. | Current on-site workers may be exposed to wind blown volatiles on site if the interim cap is not adequately maintained. |
| Future | Soil | Surface Soil | Surface Soil | Adolescent Trespasser | Adolescent | Ingestion Dermal. | On-Site | Quant. | Area capped under interim remedy. Potential for future exposures if cap is not maintained. |
| | | | Particulates | Adolescent Trespasser | Adolescent | Inhalation | On-Site | Quant. | Area capped under interim remedy. Potential for future exposures if cap is not maintained. |
| | | | Volatiles | Adolescent Trespasser | Adolescent | Inhalation | On-Site | Quant. | Area capped under interim remedy. Potential for future exposures if cap is not maintained. |
| Current/ Future | Surface Soil | Surface Soil | Volatiles (Windblown) | Off-Site Resident | Adult | Inhalation | Off-Site | Quant. | Area zoned industrial. Off-site resident is over 1 mile away from site. Screening level assessment found cancer risks and non-cancer health hazards at or below levels of concern. |
| Current/ Future | Surface Soil | Surface Soil | Volatiles (Windblown) | Off-Site Resident | Child | Inhalation | Off-Site | Quant. | Area zoned industrial. Off-site resident is over 1 mile away from site. Screening level assessment found cancer risks and non-cancer health hazards at or below levels of concern. |

| | | | | | | | | | |
|--------------------|-----------------------------|----------------------------|-----------------------------|------------------------|-------|----------------------|----------|--------|--|
| Current/ Future | Surface Soil | Surface Soil | Particulates (Windblown) | Off-Site Resident | Adult | Inhalation | Off-Site | Quant. | Area zoned industrial. Off-site resident is over 1 mile away from site. Screening level assessment found cancer risks and non-cancer health hazards at or below levels of concern. |
| Current/ Future | Surface Soil | Surface Soil | Particulates (Windblown) | Off-Site Resident | Child | Inhalation | Off-Site | Quant. | Area zoned industrial. Off-site resident is over 1 mile away from site. Screening level assessment found cancer risks and non-cancer health hazards at or below levels of concern. |
| Future | Ground water- Shallow | Groundwater r - Shallow | Tap Water | Site Worker | Adult | Ingestion | On-Site | Quant. | On-site workers may use aquifer for drinking water purposes in future. |
| | Soil | Subsurface Soil | Subsurface Soil | Construction worker | Adult | Ingestion/ Dermal | On-Site | Quant. | Potential site development may involve construction activities. |
| | Soil | Subsurface Soil | Particulates | Construction Worker | Adult | Inhalation | On-Site | Quant. | Potential site development may involve construction activities. |

Table 4A Oral Cancer Toxicity Values for Chemicals of Concern.

| Chemical of Concern | Oral Cancer Slope Factor | Dermal Cancer Slope Factor | Slope Factor Units | Weight of Evidence/ Cancer Guideline Description | Source | Date (mm/dd/yyyy) |
|-------------------------|--------------------------|----------------------------|--------------------|---|--------|-------------------|
| Tetrachloroethylene | 5.2 x 10E-2 | 5.2 x 10E-2 | mg/kg-day-1 | B2 | NCEA | 07/05/00 |
| Trichloroethylene | 1.1x10E-02 | 1.1x10E-02 | mg/kg-day-1 | C/B2 | NCEA | 07/05/00 |
| Benzo-a-anthracene | 7.3 | 7.3 | mg/kg-day-1 | B2 | NCEA | 07/05/00 |
| Benzo-a-pyrene | 7.3 | 7.3 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Dibenzo(ah) anthracene | 7.3 | 7.3 | mg/kg-day-1 | B2 | NECA | 07/05/00 |
| Indeno(1,2,3-cd) pyrene | 0.73 | 0.73 | mg/kg-day-1 | B2 | NECA | 07/05/00 |
| N-nitroso-diphenylamine | 4.9 x 10E-03 | 4.9 x 10E-03 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| 1,1,-dichloro-ethylene | 0.6 | 0.6 | mg/kg-day-1 | C | IRIS | 07/05/00 |
| Vinyl chloride | 1.9 | 1.9 | mg/kg-day-1 | A | IRIS | 07/05/00 |
| Aldrin | 17.0 | 17.0 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Dieldrin | | | | | | |
| Total PCBs | 2.0 | 2.0 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Arsenic | 1.5 | 1.5 | mg/kg-day-1 | A | IRIS | 07/05/00 |
| 1,2-dichloroethane | 9.1 x 10E-2 | 9.1 x 10E-2 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |

| | | | | | | |
|-----------------------------|--------------------|--------------------|-------------|----|------|----------|
| Benzidine | 230 | 230 | mg/kg-day-1 | A | IRIS | 07/05/00 |
| Benzene | 1.5 to 5.5 x 10E-2 | 1.5 to 5.5 x 10E-2 | mg/kg-day-1 | A | IRIS | 07/05/00 |
| Chloroform | 8.3 x 10E-03 | 8.3 x 10E-03 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| 1,1,2,2-Tetra chloroethane | 0.2 | 0.2 | mg/kg-day-1 | C | IRIS | 07/05/00 |
| Methylene chloride | 7.5 x 10E-03 | 7.5 x 10E-03 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Chlorobenzene | NA | NA | | D | IRIS | 07/05/00 |
| 1,1-Dichloroethane | NA | NA | | C | IRIS | 07/05/00 |
| 1,2-Dichloroethane | 9.1 x 10E-1 | 9.1 x 10E-1 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Toluene | NA | NA | | D | IRIS | 07/05/00 |
| Methyl ethyl ketone | NA | NA | | D | IRIS | 07/05/00 |
| 1,1,1-Trichloro ethane | NA | NA | | D | IRIS | 07/05/00 |
| Nitrobenze | NA | NA | | D | IRIS | 07/05/00 |
| Bis-2-ethyl hexyl phthalate | 0.014 | 0.014 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Isophorone | 9.5 x 10E-04 | 9.5 x 10E-04 | mg/kg-day-1 | C | IRIS | 07/05/00 |

Table 4B. Inhalation Cancer Toxicity Values for Chemicals of Concern.

| Chemical of Concern | Inhalation Unit Risk Factor | Units | Adjustment | Inhalation Cancer Slope Factor | Units | WOE Classification | Source | Date (mm/dd/yyyy) |
|-----------------------|-----------------------------|----------------|------------|--------------------------------|-------------|--------------------|--------|-------------------|
| Chloroform | 2.3x10E-5 | ug/cubic meter | 70/20 | 8.1x10E-02 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| 1,1-dichloro-ethylene | 5.0x10E-5 | ug/cubic meter | 70/20 | 1.2x10E+00 | mg/kg-day-1 | C | IRIS | 07/05/00 |
| PCBs | 1x10E-4 | ug/cubic meter | 70/20 | 4.0x10E-01 | mg/kg-day-1 | B2 | IRIS | 07/05/00 |
| Trichloro-ethylene | NA | | | 6.0x10E-03 | mg/kg-day-1 | B2/C | IRIS | 07/05/00 |
| Vinyl Chloride | 8.4x10E-5 | ug/cubic meter | 70/20 | 3.0x10E-01 | mg/kg-day-1 | A | IRIS | 07/05/00 |
| Arsenic | 4.3x10E-3 | ug/cubic meter | 70/20 | 1.5x10E+1 | mg/kg-day-1 | A | IRIS | 07/05/00 |
| Chromium VI | 1.2x10E-2 | ug/cubic meter | 70/20 | 4.0x10E+1 | mg/kg-day-1 | A | IRIS | 07/05/00 |

Table 5 Non-Cancer Oral Toxicity Values

| Chemical of Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Dermal RfD | Dermal RfD Units | Primary Target Organ | Combined Uncertainty/ Modifying/ Factors | Source of RfD Target Organ | Dates of RfD Target Organ (mm/dd/yyyy) |
|-----------------------|------------------------|----------------|----------------|------------|------------------|----------------------|--|----------------------------|--|
| Benzene | Chronic | 3x10E-3 | mg/kg-day | 3x10E-3 | mg/kg-day | Blood | 1000 | NCEA | 07/05/00 |
| Chloroform | Chronic | 1x10E-2 | mg/kg-day | 1x10E-2 | mg/kg-day | Liver | 1000 | IRIS | 07/05/00 |
| Chloro-benzene | Chronic | 2x10E-2 | mg/kg-day | 2x10E-2 | mg/kg-day | Liver | 1000 | IRIS | 07/05/00 |
| 1,1-dichloroethane | Chronic | 1x10E-1 | mg/kg-day | 1x10E-1 | mg/kg-day | NOEL | 100 | HEAST | 07/05/00 |
| 1,2-dichloroethane | Chronic | 3x10E-2 | mg/kg-day | 3x10E-2 | mg/kg-day | GI | 1000 | NCEA | 07/05/00 |
| 1,1,1-trichloroethane | Chronic | 0.28 | Mg/kg-day | 0.28 | mg/kg-day | Liver | 90 | NCEA | 07/05/00 |
| Isophorone | Chronic | 0.2 | Mg/kg-day | 0.2 | Mg/kg-day | NOAEL | 1000 | IRIS | 07/05/00 |
| Tetrachloroethylene | Chronic | 1x10E-02 | mg/kg-day | 1x10E-02 | mg/kg-day | Liver | 1000 | IRIS | 07/05/00 |
| Toluene | Chronic | 2x10E-01 | mg/kg-day | 2x10E-01 | mg/kg-day | Kidney/ Liver | 1000 | IRIS | 03/05/00 |
| Trichloroethylene | Chronic | 0.006 | mg/kg-day | 0.006 | mg/kg-day | NOAEL | 3000 | NCEA | 07/05/00 |
| Benzidine | Chronic | 3x10E-03 | mg/kg-day | 3x10E-03 | mg/kg-day | LOAEL | 1000 | IRIS | 07/05/00 |

| | | | | | | | | | |
|--------------------------|---------|----------|-----------|----------|-----------|-------------------|--------|------|----------|
| Benzo-a-pyrene | Chronic | NA | | | | | | | 07/05/00 |
| Benzo-a-anthracene | Chronic | NA | | | | | | | 07/05/00 |
| Benzo-b-fluoranthene | Chronic | NA | | | | | | | 07/05/00 |
| Dibenzo-ah-anthracene | Chronic | NA | | | | | | | 07/05/00 |
| Indeno (1,2,3-cd) pyrene | Chronic | NA | | | | | | | 07/05/00 |
| Methyl ethyl ketone | Chronic | 0.6 | Mg/kg-day | 0.6 | Mg/kg-day | Dec. birth weight | 1000 | IRIS | 07/05/00 |
| Methylene chloride | Chronic | 0.06 | Mg/kg-day | 0.06 | Mg/kg-day | Liver | 100 | IRIS | 07/05/00 |
| N-nitroso-diphenyl amine | Chronic | 0.02 | Mg/kg-day | 0.02 | Mg/kg-day | LOAEL | 3000 | NCEA | 07/05/00 |
| Nitro-benzene | Chronic | 0.0005 | mg/kg-day | 0.005 | mg/kg-day | Liver | 10,000 | IRIS | 07/05/00 |
| Aldrin | Chronic | 3x10E-05 | mg/kg-day | 3x10E-05 | mg/kg-day | Liver | 1000 | IRIS | 07/05/00 |
| Dieldrin | Chronic | 5x10E-05 | mg/kg-day | 5x10E-05 | mg/kg-day | Liver | 100 | IRIS | 07/05/00 |
| Aroclor 1254 | Chronic | 2x10E-05 | mg/kg-day | 2x10E-05 | mg/kg-day | Immune System | 300 | IRIS | 07/05/00 |

| | | | | | | | | | |
|----------------------------|------------------------|----------------|----------------------|----------------|----------------------|----------------------|--|-------------------------------------|--------------------|
| Aroclor 1016 | Chronic | 7x10E-05 | mg/kg-day | 7x10E-05 | mg/kg-day | Reduce Birth Weight | 100 | IRIS | 07/05/00 |
| Arsenic | Chronic | 3x10E-04 | mg/kg-day | 3x10E-04 | mg/kg-day | Skin | 3 | IRIS | 07/05/00 |
| 1,1,-dichloroethylene | Chronic | 9x10E-03 | mg/kg-day | 9x10E-03 | mg/kg-day | Liver | 1,000 | IRIS | 07/05/00 |
| Bis-2-ethyl hexylphthalate | Chronic | 2x10E-02 | mg/kg-day | 2x10E-02 | mg/kg-day | Liver | 1000 | IRIS | 07/05/00 |
| 1,1,2,2-tetra chloroethane | Chronic | 6x10E-02 | mg/kg-day | 6x10E-02 | mg/kg-day | Liver | 1000 | NCEA | 07/05/00 |
| Aroclor 1254 | Sub-Chronic | 5x10E-5 | mg/kg-day | 5x10E-05 | mg/kg-day | Immune System | 100 | HEAST | 07/05/00 |
| Chemical of Concern | Chronic/ Subchronic | Inhalation RfC | Inhalation RfC Units | Inhalation RfD | Inhalation RfD Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD:RfD: Target Organ | Dates (mm/dd/yyyy) |
| Chloroform | Chronic | | | 8.6x10E-05 | mg/kg-day | Liver | | NCEA | 07/05/00 |

Table 6A Summary of Cancer Risks Greater than 1×10^{-6} for Specific RME Receptors

| Scenario Timeframe: Current/Future | | | | | | | | |
|---|----------------------------|-----------------------------|-----------------------|----------------------|----------------------|--------|--------------------|-----------------------|
| Receptor Population: Adult On-Site Worker | | | | | | | | |
| Receptor Age: Adult | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| Surface Soil (0 to 2 feet) | Surface Soil (0 to 2 feet) | Soil On-site Direct Contact | Tetrachloro ethylene | 3.9×10^{-5} | | | | 3.9×10^{-5} |
| | | | Trichloro ethylene | 2.2×10^{-6} | 7.6×10^{-8} | | | 2.2×10^{-6} |
| | | | Benzo-a-anthracene | 5.8×10^{-6} | | | | 5.8×10^{-6} |
| | | | Benzo-a-pyrene | 1.2×10^{-5} | | | | 1.2×10^{-5} |
| | | | Benzo-b-fluoranthene | 2.2×10^{-6} | | | | 2.2×10^{-6} |
| | | | Dibenzo-ah anthracene | 3.1×10^{-6} | | | | 3.1×10^{-6} |

| | | | | | | | | |
|-----------------|-----------------|------------------------------|---------------------------------|-------------|------------|-------------------|--|-------------|
| | | | Indeno (123-cd) pyrene | 1.5x10E-06 | | | | 1.5x10E-06 |
| | | | N-nitroso- diphenylami ne | 2.6x10E-06 | | | | 2.6x10E-06 |
| | | | 1,1- dichloroeth ylene | 1.9x10E-08 | 2.6x10E-06 | | | 2.6x10E-06 |
| | | | Vinyl Chloride | | 2.1x10E-06 | | | 2.1x10E-06 |
| | | | Aldrin | 1.7x10E-04 | | | | 1.7x10E-04 |
| | | | Dieldrin | 1.6x10E-04 | | | | 1.6x10E-04 |
| | | | Total PCBs | 5.3x10E-03 | 5.6x10E-08 | 9.7x10E-03 | | 1.5x10E-02 |
| | | | Arsenic | 1.6x10E-05 | | 2.9x10E-05 | | 4.5x10E-05 |
| | | | | | | Total Cancer Risk | | 1.5x10E-2 |
| Ground water | Ground water | On-site Direct Contact | Benzene | 8.9x 10E-04 | | | | 8.9x 10E-04 |
| | | | Chloroform | 1.4x10E-02 | | | | 1.4x10E-02 |
| | | | 1,2-dichloro ethane | 1.5x10E-01 | | | | 1.5x10E-01 |
| | | | Vinyl chloride | 4.8x10E-02 | | | | 4.8x10E-02 |

| | | | | | | | | |
|--|--|--|--------------------------------|------------|--|-------------------|--|------------|
| | | | 1,1,2,2- tetra chloroethene | 5.1x10E-03 | | | | 5.1x10E-03 |
| | | | Tetrachoro- ethylene | 4.5x10E-03 | | | | 4.5x10E-03 |
| | | | Methylene chloride | 5.2x10E-03 | | | | 5.2x10E-03 |
| | | | Trichloro- ethylene | 8.2x10E-03 | | | | 8.2x10E-03 |
| | | | Total PCBs | 2.4x10E-02 | | | | 2.4x10E-02 |
| | | | Arsenic | 1.6x10E-02 | | | | 1.6x10E-02 |
| | | | | | | Total Cancer Risk | | 2.5x10E-1 |
| | | | | | | Total Risk | | 2.6x10E-1 |

Table 6B Summary of Cancer Risks Greater than 1×10^{-6} for Specific CTE Receptors

| Scenario Timeframe: Current/Future | | | | | | | | |
|---|----------------------------|-----------------------------|----------------------------|----------------------|------------|-------------------|--------------------|-----------------------|
| Receptor Population: Adult On-Site Worker | | | | | | | | |
| Receptor Age: Adult | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| Surface Soil (0 to 2 feet) | Surface Soil (0 to 2 feet) | Soil On-site Direct Contact | Aldrin | 3.9×10^{-5} | | | | 3.9×10^{-5} |
| | | | Dieldrin | 3.7×10^{-5} | | | | 3.7×10^{-5} |
| | | | Total PCBs | 1.2×10^{-3} | | | | 1.2×10^{-3} |
| | | | | | | Total Cancer Risk | | 1.2×10^{-3} |
| Ground water | Ground water | On-site Direct Contact | Benzene | 1.4×10^{-4} | | | | 1.4×10^{-4} |
| | | | Chloroform | 2.2×10^{-2} | | | | 2.2×10^{-2} |
| | | | 1,2-dichloro ethane | 2.4×10^{-2} | | | | 2.4×10^{-2} |
| | | | 1,1,2,2-tetra chloroethene | 5.1×10^{-3} | | | | 5.1×10^{-3} |

| | | | | | | | | |
|--|--|--|---------------------|------------|--|-------------------|--|------------|
| | | | Tetrachoro-ethylene | 7.2x10E-04 | | | | 7.2x10E-04 |
| | | | Trichloro-ethylene | 1.0x10E-02 | | | | 1.0x10E-02 |
| | | | Vinyl Chloride | 7.9x10E-03 | | | | 7.9x10E-03 |
| | | | Total PCBs | 2.9x10E-03 | | | | 2.9x10E-03 |
| | | | Arsenic | 2.6x10E-03 | | | | 2.6x10E-03 |
| | | | | | | Total Cancer Risk | | 4.7x10E-02 |
| | | | | | | | | |
| | | | | | | Total Risk | | 4.8x10E-02 |

Table 6C. Summary of Cancer Risk Greater than 1×10^{-6} for Specific RME Receptors

| Scenario Timeframe: Current/Future | | | | | | | | |
|------------------------------------|----------------------------|-----------------------------|-----------------------|-----------------------|----------------------|----------------------|--------------------|-----------------------|
| Receptor Population: Trespasser | | | | | | | | |
| Receptor Age: Adolescent | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| Surface Soil (0 to 2 feet) | Surface Soil (0 to 2 feet) | Soil On-site Direct Contact | Tetrachloro ethylene | 1.4×10^{-5} | | | | 1.4×10^{-5} |
| | | | Benzo-a-anthracene | 2.1×10^{-6} | | | | 2.1×10^{-6} |
| | | | Benzo-a-pyrene | 4.3×10^{-6} | | | | 4.3×10^{-6} |
| | | | Dibenzo-ah anthracene | 1.1×10^{-6} | | | | 1.1×10^{-6} |
| | | | Aldrin | 6.15×10^{-5} | | | | 6.1×10^{-5} |
| | | | Dielrin | 5.8×10^{-5} | | | | 5.8×10^{-5} |
| | | | Total PCBs | 1.9×10^{-3} | 2.1×10^{-8} | 4.6×10^{-4} | | 2.4×10^{-3} |
| | | | Arsenic | 5.7×10^{-6} | | 1.4×10^{-6} | | 7.1×10^{-6} |
| | | | | | | Total Cancer Risk | | 2.5×10^{-3} |
| | | | | | | Total Risk | | 2.6×10^{-1} |

Table 6D. Summary of Cancer Risks Greater than 1×10^{-6} for Specific CTE Receptors

| Scenario Timeframe: Current/Future Receptor Population: Trespasser Receptor Age: Adolescentt | | | | | | | | |
|--|----------------------------|-----------------------------|---------------------|----------------------|------------|--------|--------------------------|-----------------------|
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| Surface Soil (0 to 2 feet) | Surface Soil (0 to 2 feet) | Soil On-site Direct Contact | PCBs | 4.8×10^{-4} | | | | 4.8×10^{-4} |
| | | | | | | | Total Cancer Risk | 4.8×10^{-4} |

Table 6E. Summary of Cancer Risks Greater than 1×10^{-6} for Specific RME Receptors

| Scenario Timeframe: Future Receptor Population: Construction Worker Receptor Age: Adult | | | | | | | | |
|---|-------------------------------|--|----------------------|----------------------|------------|----------------------|--------------------|-----------------------|
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| | Subsurface Soil (5 to 6 feet) | Subsurface Soil On-site Direct Contact | 1,2-Dichloroethane | 1.2×10^{-6} | | | | 1.2×10^{-6} |
| | | | Tetrachloroethylene | 4.2×10^{-6} | | | | 4.2×10^{-6} |
| | | | Benzidine | 2.7×10^{-3} | | | | 2.7×10^{-3} |
| | | | Benzo-a-anthracene | 3.0×10^{-5} | | | | 3.0×10^{-5} |
| | | | Benzo-a-pyrene | 3.8×10^{-5} | | | | 3.8×10^{-5} |
| | | | Benzo(b)fluoranthene | 5.5×10^{-6} | | | | 5.5×10^{-6} |
| | | | Indeno(123-cd)pyrene | 3.1×10^{-6} | | | | 3.1×10^{-6} |
| | | | Total PCBs | 3.6×10^{-5} | | 1.0×10^{-5} | | 4.6×10^{-5} |

| | | | | | | | | |
|--|--|--|---------|------------|--|-------------------|--|------------|
| | | | Arsenic | 4.5x10E-06 | | 2.8x10E-07 | | 4.5x10E-06 |
| | | | | | | Total Cancer Risk | | 2.8x10E-03 |

Table 6F. Summary of Cancer Risks Greater than 1×10^{-6} for Specific RME Receptors

| Scenario Timeframe: Future Receptor Population: Construction Worker Receptor Age: Adult | | | | | | | | |
|---|------------------------|--|----------------------|------------|------------|--------|--------------------------|-----------------------|
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| Subsurface Soil (Deep) | Subsurface Soil (Deep) | Subsurface Soil On-site Direct Contact | Tetrachloro ethylene | 2.3x10E-06 | | | | 2.3x10E-06 |
| | | | Vinyl Chloride | 1.5x10E-06 | | | | 1.5x10E-06 |
| | | | Benzo(a) pyrene | 1.7x10E-06 | | | | 1.7x10E-06 |
| | | | Total PCBs | 1.1x10E-06 | | | | 1.1x10E-06 |
| | | | Arsenic | 1.3x10E-06 | | | | 1.3x10E-06 |
| | | | | | | | Total Cancer Risk | 7.9x10E-06 |

Table 6F. Summary of Cancer Risks Greater than 1×10^{-6} for Specific RME Receptors

| Scenario Timeframe: Future Receptor Population: Construction Worker Receptor Age: Adult | | | | | | | | |
|---|-----------------------------|--|----------------------|----------------------|------------|-------------------|--------------------|-----------------------|
| | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Ingestion | Inhalation | Dermal | External Radiation | Exposure Routes Total |
| Subsurface Soil (Very Deep) | Subsurface Soil (Very Deep) | Subsurface Soil On-site Direct Contact | Tetrachloro ethylene | 1.3×10^{-6} | | | | 1.3×10^{-6} |
| | | | | | | Total Cancer Risk | | 1.3×10^{-6} |

Table 7A. Non-Cancer Health Hazards for RME Individual (HIs>1.0)

| Scenario Timeframe: Current/Future Receptor Population: On-Site Worker Receptor Age: Adult | | | | | | | | |
|--|----------------------------|-----------------------------|-------------------------------|----------------------|-----------|-----------------|--------|-----------------------|
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Ingestion | Inhalation | Dermal | Exposure Routes total |
| Surface Soil (0 to 2 feet) | Surface Soil (0 to 2 feet) | On-Site Direct Contact | Aroclor 1242 | Reduced Birthweight | 100.0 | | 190.0 | 290.0 |
| | | | Aroclors 1248, 1254, and 1260 | Immune System | 2 | | 3.8 | 5.8 |
| | | | | | | Total Soil - HI | | 295.8 |
| Ground-water | Ground-water | Ground-water Direct Contact | Benzene | Blood | 24.0 | | | 24.0 |
| | | | Chloroform | Liver | 600 | | | 600 |
| | | | Chloro-benzene | Liver | 2.0 | | | 2.0 |
| | | | 1,2-Dichloro-ethane | GI | 150.0 | | | 150.0 |

| | | | | | | | | |
|--|--|--|------------------------------|--------|-------|--------------------------|--|---------|
| | | | 1,2- dichloro-ethylene (cis) | Blood | 32.0 | | | 32.0 |
| | | | Tetrachloroethylene | Liver | 24.0 | | | 24.0 |
| | | | Toluene | Kidney | 4.4 | | | 4.4 |
| | | | Methylene chloride | Liver | 33.0 | | | 33.0 |
| | | | Trichloro-ethylene | NOAEL | 260.0 | | | 260.0 |
| | | | 1,1,1-Trichloro-ethane | Liver | 2.8 | | | 2.8 |
| | | | Vinyl Chloride | Liver | 14.0 | | | 14.0 |
| | | | Nitro-benzene | Liver | 1,100 | | | 1,100 |
| | | | Aroclor 1254 | Immune | 2,400 | | | 2,400 |
| | | | Arsenic | Skin | 100 | | | 100 |
| | | | | | | Total Drinking Water HIs | | 4,746.2 |
| | | | | | | Total HIs | | 5,042.0 |

Table. 7B. Non-Cancer Health Hazards for CTE Individual (HIs > 1.0)

| Scenario Timeframe: Current/Future | | | | | | | | |
|--------------------------------------|----------------------------|------------------------|-------------------------------|----------------------|-----------|-----------------|--------|-----------------------|
| Receptor Population: On-Site Workers | | | | | | | | |
| Receptor Age: Adults | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Ingestion | Inhalation | Dermal | Exposure Routes total |
| Surface Soil (0 to 2 Feet) | Surface Soil (0 to 2 Feet) | On-Site Direct Contact | Aroclor 1242 | Reduced Birthweight | 92.0 | | 17 | 109 |
| | | | Aroclors 1248, 1254, and 1260 | Immune System | 1.8 | | 0.33 | 2.1 |
| | | | | | | Total Soil - HI | | 111.1 |
| | | | Benzene | Blood | 15.0 | | | 15.0 |
| | | | Chloroform | Liver | 600 | | | 600 |
| | | | Chlorobenzene | Liver | 2.0 | | | 2.0 |
| | | | 1,2-Dichloroethane) | GI | 150.0 | | | 150.0 |
| | | | 1,2-dichloroethylene (cis) | Blood | 32.0 | | | 32.0 |

| | | | | | | | | |
|--|--|--|-----------------------|--------|-------|--------------------------|--|---------|
| | | | Tetrachloro ethylene | Liver | 24.0 | | | 24.0 |
| | | | Toluene | Kidney | 4.4 | | | 4.4 |
| | | | Methylene chloride | Liver | 33.0 | | | 33.0 |
| | | | Trichloroethylene | NOAEL | 260.0 | | | 260.0 |
| | | | 1,1,1-Trichloroethane | Liver | 2.8 | | | 2.8 |
| | | | Vinyl Chloride | Liver | 14.0 | | | 14.0 |
| | | | Nitrobenzene | Liver | 1,100 | | | 1,100 |
| | | | Aroclor 1254 | Immune | 2,400 | | | 2,400 |
| | | | Arsenic | Skin | 100 | | | 100 |
| | | | | | | Total Drinking Water HIs | | 4,746.2 |
| | | | | | | Total HIs | | 5,042.0 |

Table. 7C.. Non-Cancer Health Hazards for RME Individual (HIs > 1.0)

| Scenario Timeframe: Future | | | | | | | | |
|----------------------------------|----------------------------|------------------------|-------------------------------|----------------------|-----------|-----------------|--------|-----------------------|
| Receptor Population: Trespassers | | | | | | | | |
| Receptor Age: Adolescents | | | | | | | | |
| | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Ingestion | Inhalation | Dermal | Exposure Routes total |
| Surface Soil (0 to 2 Feet) | Surface Soil (0 to 2 Feet) | On-Site Direct Contact | Aroclor 1242 | Reduced Birthweight | 110.0 | | 120.0 | 230.0 |
| | | | Aroclors 1248, 1254, and 1260 | Immune System | 2 | | 2.3 | 4.3 |
| | | | | | | Total Soil - HI | | 234.3 |

Table. 7.D. Non-Cancer Health Hazards for CTE Individual (HIs > 1.0)

| Scenario Timeframe: Future | | | | | | | | |
|----------------------------------|----------------------------|------------------------|---------------------|----------------------|-----------|-----------------|--------|-----------------------|
| Receptor Population: Trespassers | | | | | | | | |
| Receptor Age: Adolescents | | | | | | | | |
| | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Ingestion | Inhalation | Dermal | Exposure Routes total |
| Surface Soil (0 to 2 Feet) | Surface Soil (0 to 2 Feet) | On-Site Direct Contact | Aroclor 1242 | Reduced Birthweight | 26.0 | | 12.0 | 38.0 |
| | | | | | | Total Soil - HI | | 38.0 |

Table. 7E. Non-Cancer Health Hazards for RME Individual (HIs > 1.0)

| Scenario Timeframe: Current/Future Receptor Population: On-Site Workers Receptor Age: Adults | | | | | | | | |
|--|----------------------------|------------------------|---------------------|----------------------|-----------|-----------------|--------|-----------------------|
| | | | | | | | | |
| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Ingestion | Inhalation | Dermal | Exposure Routes total |
| Surface Soil (5 to 6 Feet) | Surface Soil (5 to 6 Feet) | On-Site Direct Contact | Aroclor 1242 | Reduced Birthweight | 24.0 | | 6.9 | 30.9 |
| | | | | | | Total Soil - HI | | 30.9 |
| | | | | | | Total HIs | | 5,042.0 |

APPENDIX III
ADMINISTRATIVE RECORD INDEX

**SCIENTIFIC CHEMICAL PROCESSING (CARLSTADT) SITE
OPERABLE UNIT II
ADMINISTRATIVE RECORD
INDEX OF DOCUMENTS**

1.0 SITE IDENTIFICATION

1.5 Previous Operable Unit Information

- P. 100001 - Report: Final Report. Remedial Investigation. SCP Site, Carlstadt,
100212 New Jersey. Volume 1. (Text, Tables and Figures), prepared by Dames & Moore, March 1, 1990.
- Declaration Statement, Record of Decision, Scientific Chemical Processing Site, September 14, 1990. (Note: This document can be found in the Scientific Chemical Processing (Carlstadt) OUI Administrative Record, pages 4567-4650).
- P. 100213 - Report: Final Work Plan. Interim Remedy. Remedial Design Work Plan,
100442 Superfund Site at 216 Paterson Plank Road at Carlstadt, New Jersey, prepared by Canonie Environmental, prepared for The Cooperating PRP Group, March, 1991.
- P. 100443 - Report: Final Report. Interim Remedy For First Operable Unit, Scientific
101002 Chemical Processing Superfund Site At 216 Paterson Plank Road, Carlstadt, New Jersey, prepared by Canonie Environmental, September 1992.
- P. 101003 - Report: Focused Feasibility Study. Investigation Work Plan, First
101197 Operable Unit Fill. 216 Paterson Plank Road Site, Carlstadt, New Jersey, prepared by Golder Associates, prepared for The 216 Paterson Plank Road Cooperating PRP Group, April 1996.
- P. 101198 - Report: Focused Feasibility Study. Investigation Report, 216 Paterson
101353 Plank Road Site, Carlstadt, New Jersey, prepared by Golder Associates, Inc., prepared for The 216 Paterson Plank Road Cooperating PRP Group, November 1997.
- P. 101354 - Report: Investigation Derived Waste and Sludge Tank Management
101953 Documentation Report, 216 Paterson Plank Road Site, Carlstadt, New Jersey, prepared by Golder Associates, Inc., prepared for The 216 Paterson Plank Road Cooperating PRP Group, July 1998.
- P. 101954 - Report: First Operable Unit, Treatability Testing Work Plan,
102220 216 Paterson Plank Road Site, Carlstadt, New Jersey, prepared by Golder Associates, Inc., prepared for The 216 Paterson Plank Road Cooperating PRP Group, August 1998.
- P. 102221 - Report: Five-Year Review Report. Scientific Chemical Processing Site,
102224 Carlstadt, Bergen County, New Jersey, prepared by U.S. EPA, Region II, September 1998.
- P. 102225 - U.S. EPA, Region II, Administrative Order. Index No. II, CERCLA-00116,
102255 undated

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

- P. 400001 - Report: Focused Feasibility Study, Operable Unit 2, Final Remedy:
400392 Fill and Shallow Groundwater, 216 Paterson Plant Road Site, Carlstadt,
New Jersey, prepared by Golder Associates, prepared for 216 Paterson
Plank Road Cooperating PRP Group, April 2001.

**APPENDIX IV
STATE LETTER**



State of New Jersey
Department of Environmental Protection

James E. McGreevey
Governor

Bradley M. Campbell
Commissioner

June 28, 2002

Ms. Jane Kenney, USEPA Administrator
US Environmental Protection Agency
290 Broadway
New York, NY 10007-1866

Re: Final Record of Decision for Scientific Chemical Processing, Inc. Superfund Site
Operable Unit 2, Carlstadt Township, Bergen County, New Jersey

Dear Ms. Kenney:

This is to formally notify the United States Environmental Protection Agency (USEPA) that the New Jersey Department of Environmental Protection (NJDEP) has evaluated the selected final remedy for Operable Unit 2 - Fill Area at the Scientific Chemical Processing, Inc. Superfund Site and concurs with the remedy as stated in the Record of Decision.

The Record of Decision documents the selection of a containment remedy with in-situ treatment (air stripping) of the hot spot area followed by solidification / stabilization, landfill cap containment cover system, and shallow groundwater collection for the OU2 - Fill Area. If the appropriate performance standards for treatment, solidification and containment are not met in the selected remedy, then removal of the hot spot area, as described in Alternative SC-3, will be performed as a contingency remedy. Deed Notices will be established as an institutional control component for this remedy. In addition, all groundwater (on-site and off-site) and surface water (Peach Island Creek) sampling/investigations will continue to be conducted in preparation for the development of remedial alternatives for a groundwater/surface water contamination OU3 remedy.

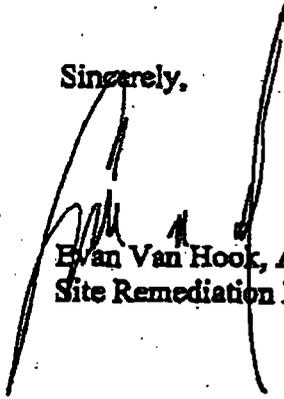
The objectives of the Remedial Action for the OU2 Fill Area are to:

- ◆ Mitigate the direct contact risk and leaching of contaminants from soil, fill material and sludge into the groundwater;
- ◆ Reduce the toxicity and mobility of the hot spot contaminants via treatment;
- ◆ Provide hydraulic control of the shallow aquifer by maintaining an inward groundwater gradient;
- ◆ Protect human health and the environment by implementing institutional controls (Deed Notices) as necessary; and
- ◆ Perform remediation in such a manner that may allow site re-use for certain limited commercial purposes.

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New Jersey fully appreciates the importance of the Record of Decision in the cleanup process and will continue to take all reasonable steps to ensure that the State's commitments in this area are met.

Sincerely,



Evan Van Hook, Assistant Commissioner
Site Remediation Program

C: Bruce Venner, BCM

APPENDIX V
RESPONSIVENESS SUMMARY

APPENDIX V

RESPONSIVENESS SUMMARY SCIENTIFIC CHEMICAL PROCESSING SUPERFUND SITE OPERABLE UNIT 2

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and the concerns regarding the Proposed Plan for the Scientific Chemical Processing (SCP) Superfund Site, and the U. S. Environmental Protection Agency's (EPA's) responses to those comments. At the time of the public comment period, EPA proposed a preferred alternative for remediating and containing the contamination in the SCP Site's Fill Area, which has been designated Operable Unit 2 (OU2). All comments summarized in this document have been considered in EPA's final decision for selection of a remedial alternative for OU2.

This Responsiveness Summary is divided into the following sections:

- I. **BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS:** This section provides the history of community involvement and interests regarding the SCP Site.
- II. **COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES:** This section contains summaries of oral comments received by EPA at the public meeting, EPA's responses to these comments, as well as responses to written comments received during the public comment period.

The last section of this Responsiveness Summary includes attachments which document public participation in the remedy selection process for this site. They are as follows:

Attachment A contains the Proposed Plan that was issued on August 15, 2001 and distributed to the public for review and comment;

Attachment B contains the public notices that appeared in The Bergen Record;

Attachment C contains the transcript of the public meeting; and

Attachment D contains the written comments received by EPA during the public comment period.

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Aside from periodic interaction with the adjacent industrial land owners, since the issuance of the OU1 Record of Decision in September 1990, the level of community interest in the SCP site has been low. EPA and the Potentially Responsible Parties (PRPs) have addressed relatively minor issues mainly regarding property access for off-site well sampling/installation and issues about Site aesthetics. In response to local concerns, the PRPs planted evergreen shrubbery on the Paterson Plank Road side of the Site, and painted the on-site groundwater temporary storage tank. Since these actions were taken, there has been no major concerns raised by the local community.

OU1 Remedy: The RI/FS Report, the Proposed Plan and other documents which comprise the administrative record of the interim remedy (i.e., OU1) were released to the public on May 19, 1990. These documents were made available to the public at the William E. Dermody Free Library in Carlstadt, New Jersey. On May 19, 1990, EPA also published a notice in the Bergen Record which contained information relevant to the public comment period for the site, including the duration of the public comment period, the date of the public meeting

and availability of the administrative record. The public comment period began on May 19, 1990 and ended on June 18, 1990. In addition, a public meeting was held on June 5, 1990, at which representatives from EPA and the New Jersey Department of Environmental Protection (NJDEP) answered questions regarding the site and the interim actions under consideration. Responses to the significant comments received during the public comment period are included in the 1990 ROD's Responsiveness Summary.

OU2 Remedy: EPA's Proposed Plan for the Operable Unit 2 was released to the public on August 15, 2001. A copy of the Proposed Plan was placed in the Administrative Record and was made available in the information repository at the William E. Dermody Free Public Library. A public notice was published in the Bergen Record on August 15, 2001, advising the public of the availability of the Proposed Plan. The notice also announced the opening of a 30-day public comment period and invited all interested parties to attend an upcoming public meeting. Due to disruption of mail delivery to EPA's offices in downtown Manhattan, relating to the events of September 11, 2001, a second public notice was published in the Bergen Record on October 12, 2001 extending the comment period until October 25, 2001. A public meeting, during which EPA presented the preferred remedial alternative for OU2, was held at the Carlstadt Borough Hall, 500 Madison Street, Carlstadt, New Jersey on August 23, 2001.

Overall, the public agreed with EPA's decision not to attempt full excavation of the Fill Area. Some of the public felt it more prudent to neither attempt to treat nor remove the Sludge Area, while some felt that removal rather than treatment was the best option. However, there was no strong feeling about the specific remediation of the Sludge Area aside from the obvious need to ensure that human exposure to Sludge Area contaminants be prevented.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS, AND RESPONSES

This section summarizes comments received from the public during the public comment period, and EPA's responses.

A. SUMMARY OF QUESTIONS AND EPA'S RESPONSE FROM THE PUBLIC MEETING CONCERNING THE SCIENTIFIC CHEMICAL PROCESSING SITE - AUGUST 23, 2001

A public meeting was held on August 23, 2001 at 7:00 p.m. at the Carlstadt Borough Hall, 500 Madison St., Carlstadt, NJ. EPA and the PRP's consultant gave a presentation on the investigation findings, the Proposed Plan, and the preferred alternative for the SCP Site.

Comment #1: A citizen asked to have the on-site air stripping of the sludge area better described. Specifically, he wished to know how the contamination stripped from the sludge would be treated and whether PCBs would be removed by the air stripping process.

EPA Response: There are several ways that air can be treated. EPA will probably consider one of two options during design: oxidation treatment which would effectively destroy the contamination on-site or carbon adsorption, whereby the organics removed from the sludge would be adsorbed onto carbon. The carbon would then be taken off site by the carbon vendor for treatment. PCBs are not volatile and therefore would not be removed by the air stripping. PCBs in the sludge would be controlled by stabilizing the Sludge Area with cement and lime, subsequent to treatment by air stripping.

Comment #2: A citizen asked for some examples of organic substances and also whether any of them are suspected carcinogens.

EPA Response: Some of the examples of organic substances found at the SCP site are trichloroethylene, tetrachloroethylene, toluene, benzene and xylene. Some of these are suspected carcinogens. See Table 2 and Table 3 of the ROD for more information.

Comment #3: A citizen was concerned about the potential for releases of potential carcinogens, and whether the treatment methods would be effective in removing the

carcinogens to appropriate levels.

EPA Response: As stated in the previous response, EPA will decide the specific method to treat the contaminated air stripped from the soil during the design phase of the cleanup. During the operation of the selected air stripping method, small shrouds will be placed directly over the paddles and negative pressure will be maintained within the shroud to capture the volatile organic compounds released during mixing. Whatever decision is made, EPA will ensure compliance with all federal and state air regulatory requirements. Compliance will be assured by, among other things, air monitoring around the site perimeter. EPA will also meet with the public during the design phase to get input and hear potential concerns about the design.

Comment #4: One citizen expressed concern that Alternative SC-5 required the use of hot air, and that the air will find specific channels in the sludge and therefore not strip off all the contaminants. This citizen felt that Alternative SC-3 (removal of Hot Spot) was a better alternative than the Preferred Alternative (i.e., Alternative SC-5).

EPA Response: The air stripping technology described in Alternative SC-5 has been used to effectively treat contaminated sludges at other sites. EPA feels that the process, which includes not only aeration, but also mixing, will adequately prevent air from channeling within the sludge, and will remove the volatile organic compounds to acceptable levels. However, if the Preferred Alternative does not meet acceptable levels for both removal of VOCs and stabilization, the Sludge Area will be removed as described in Alternative SC-3, and as the commentor suggested.

Comment #5: A citizen asked the dimensions of the Sludge Area. The citizen also expressed concern that as the aeration apparatus is moved around the Sludge Area, holes will be left and the contaminants in the sludge around the holes will be able to escape to the air.

EPA Response: The Sludge Area is approximately 4,000 square feet. The commentor's concern may be from a misunderstanding of the treatment process. The selected alternative will not be removing any sludge, rather air will be forced into one small, shroud covered area at a time within the Sludge Area. As the air is being forced into the small area, mixing paddles will ensure the sludge is adequately treated. No holes will be left open in the Sludge outweighs any potential benefit of contaminant removal/stabilization.

EPA Response: The Commentor is correct in that the permanent containment remedy would, in all likelihood, effectively control and prevent exposure to the contaminants in the Sludge Area. However, due to the extremely high concentrations found in the Sludge Area, the relatively small size of the Sludge Area, and the fact the Sludge Area lends itself to treatment/ stabilization, EPA feels treatment of the Sludge Area is appropriate. This decision is consistent with the regulatory requirements of CERCLA, i.e., to treat the principal threat, which at this Site is the Sludge Area.

Comment 10: One commentor wished to know the maximum depth of the Sludge Area treatment, whether the contamination is worse at depth, and whether the contamination would get worse over time.

EPA Response: The maximum depth at which aeration and stabilization of the Sludge Area will occur is about fifteen feet. The concentration of the contamination varies with depth, however there is no clear gradation based on depth within the Sludge Area. Some of the contaminants within the sludge area break down into less toxic chemicals over time; some break down into more toxic chemicals.

C. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD FROM THE COMMUNITY AND PRP

Comments and concerns were accepted in writing during the public comment period. Written comments were received in a letter from the PRPs' consultant and from one citizen who attended the public meeting. They are answered in the following part of the Responsiveness Summary.

Comment 11: Mr Sam Chari, Ph. D., P.E., in his September 12, 2001 letter to EPA, indicated that he felt strongly that Alternative SC-3, removal of the Sludge Area, was the best remedy for the Site. His reasoning was based on his belief that the Sludge Area was not homogeneous, that air from the air stripper (used in the Selected Alternative) would escape through channels in the sludge and therefore not treat all the sludge and that rocks and debris that may be in the sludge would interfere and cause equipment to break down. The commentor felt that EPA's assessment that Alternative SC-3 had difficult technical problems and risks to workers, the underlying clay layer and to the neighboring communities was overstated. He also felt that the relatively small difference in cost and timeframe should not have been a large factor in selecting Alternative SC-5 rather than Alternative SC-3.

EPA Response: All studies done to date have indicated that the Sludge Area is homogeneous in material. EPA does not expect to find large amounts of debris in the Sludge Area. If, as the commentor claims, large amounts of debris exist in the Sludge Area, then it may preclude, due to technical issues, implementing either Alternative SC-3 or the Selected Alternative. However, as stated previously, EPA does not expect to find debris, and based on other sites and the treatability studies performed using the sludge, the aeration/stabilization technology is expected to work well to remedy and contain the contaminants in the Sludge Area. Alternative SC-3, while technically possible, has added potential risks to the clay layer and workers, without any real benefits over the Selected Remedy. Based on the above, EPA believes the appropriate decision is to proceed with the Selected Remedy. Again, if the Selected Remedy fails to work acceptably, EPA will direct the PRPs to remove the Sludge Area as described in Alternative SC-3. Costs and timeframes were not the only factors in the decision to select Alternative SC-5 over Alternative SC-3.

Comment 12: This comment was submitted by the PRPs' consultant Golder Associates. The PRPs asked that Page 10 of the Proposed Plan be clarified. Specifically, they asked for clarification on whether New Jersey Soil Cleanup Criteria (NJSCC) are ARARs.

EPA Response: The NJSCC are not ARARs; rather, they are To-Be-Considered (TBC) criteria.

Comment 13: This comment was also submitted by the PRPs. The PRPs noted that on Page 10 of the Proposed Plan, it indicated that all of the alternatives must comply with the New Jersey Technical Requirements for Site Remediation, the New Jersey Brownfield and Contaminated Site Remediation Act and any relevant local requirements. The PRPs requested that EPA clarify whether compliance with the substantive requirements of promulgated state regulations is only required when they are ARARs and more stringent than federal standards. Further, they requested clarification that aspects of the cited regulations that are not ARARs, as well as non-substantive requirements, are therefore not mandatory.

EPA Response: The PRPs are correct in their belief that requirements of promulgated state regulations are only required when they are ARARs and when they are more stringent than federal standards. Also, any aspects of the regulations cited in Comment 13 that are not ARARs, as well as any non-substantive requirements are not mandatory. However, when no ARARs exist, EPA can establish cleanup standards based on non-ARARs such as TBCs.

**ATTACHMENT A
PROPOSED PLAN**

Superfund Program Proposed Plan

U.S. Environmental Protection
Agency, Region II



Scientific Chemical Processing Site August 2001

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative for the final remedy for the contaminated soil on the Scientific Chemical Processing (SCP) Site, hereafter referred to as "the Site," located in Carlstadt Township, Bergen County, New Jersey, and provides the rationale for this preference. In addition, this Plan includes summaries of the other alternatives evaluated for use at this Site. The preferred alternative calls for improving and making permanent the key elements of the SCP Site's existing interim remedy. In addition, in-situ (i.e., in place) treatment followed by in-situ solidification/stabilization of the Hot Spot Area would be performed. Finally, institutional controls in the form of deed notices will be established in order to ensure long term protectiveness of the containment system.

This document is issued by the U.S. Environmental Protection Agency (EPA), the lead agency for site activities. The New Jersey Department of Environmental Protection (NJDEP) is the support agency for this site. EPA, in consultation with the NJDEP, will select a final remedy for the Site's Fill Area after reviewing and considering all information submitted during the 30-day public comment period. EPA, in consultation with NJDEP, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in the Proposed Plan. A final groundwater and surface water remedy will be addressed in a future Proposed Plan and Record of Decision.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Proposed Plan summarizes information that can be found in greater detail in the documents contained in the Administrative Record file for this Site. EPA and the State encourage the public to review these documents to gain a more comprehensive understanding of the Site and Superfund activities that have been conducted at the Site.

Dates to remember:

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:

August 16, 2001-September 15, 2001.

PUBLIC MEETING:

August 23, 2001 at 7:00pm

U.S. EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at

Carlstadt Borough Hall
500 Madison St.
Carlstadt, NJ

For more information, see the Administrative Record at the following locations:

William E. Dermody Free Public Library
420 Hackensack St
Carlstadt, NJ
(201) 438-8866
Hours M-Th 10:00am-5:30pm 7:00-9:00pm
Fri 10:00am-5:30pm, Sat 10:00am-1:00pm

And

U.S. EPA Records Center, Region II
290 Broadway, 18th Floor.
New York, New York 10007-1866
(212)-637-3261
Hours: Monday-Friday
9 a.m. to 5 p.m.

SITE HISTORY

The six-acre SCP Site is located at 216 Paterson Plank Road in Carlstadt, New Jersey. The Site is a corner property, bounded by Paterson Plank Road on the south, Gotham Parkway on the west, Peach Island Creek on the north and an industrial facility on the east (figure 1). The land use in the vicinity of the Site is classified as light industrial by the Borough of Carlstadt. The establishments in the immediate vicinity of the Site include a bank, stables, warehouses, freight carriers, and service sector industries. There is a residential area located approximately 6,000 feet northwest of the Site.

The land on which the SCP Site is located was purchased in 1941 by Patrick Marrone who used the land for solvent refining and solvent recovery. Mr. Marrone eventually sold the land to a predecessor of Inmar Associates, Inc. Aerial photographs from the 1950s, 1960s and 1970s indicate that drummed materials were stored on the Site. On October 31, 1970, SCP Inc. leased the Site from Inmar Associates. SCP used the Site for processing industrial wastes from 1971 until the company was shut down by court order in 1980.

While in operation, SCP received liquid byproduct streams from chemical and industrial manufacturing firms, then processed the materials to reclaim marketable products, which were sold to the originating companies. In addition, liquid hydrocarbons were processed to some extent, then blended with fuel oil. The mixtures were typically sold back to the originating companies, or to cement and aggregate kilns as fuel. SCP also received other wastes, including paint sludges, acids and other unknown chemical wastes.

In 1983, the Site was placed on the National Priorities List (NPL). Between 1983 and 1985, NJDEP required the site owner to remove approximately 250,000 gallons of wastes stored in tanks, which had been abandoned at the Site.

In May 1985, EPA assumed the lead role in the response actions, and issued notice letters to over 140 Potentially Responsible Parties (PRPs). EPA offered the PRPs an opportunity to perform a Remedial Investigation and Feasibility Study (RI/FS) for the Site. The purpose of an RI/FS is to determine the nature and extent of a site's contamination, and then to develop remedial alternatives which address the contamination. In September 1985, EPA issued Administrative Orders on Consent to the 108 PRPs who had agreed to conduct the RI/FS. Subsequently, in October 1985, EPA issued a Unilateral Order to 31 PRPs who failed to sign the Consent Order. The Unilateral Order required the 31 PRPs to cooperate with the 108 consenting PRPs on the RI/FS. In the fall of 1985, EPA also issued an Administrative Order to Inmar Associates, requiring the company to remove and properly dispose of the contents of five tanks containing wastes contaminated with Polychlorinated Biphenyls (PCBs) and numerous other hazardous substances.

Inmar removed four of the five tanks in 1986. The fifth tank was not removed at the time due to the high levels of PCBs and other contaminants found in that specific tank, and the unavailability of disposal facilities capable of handling those wastes at that time. The fifth tank and its

contents were subsequently removed by the PRPs in February 1998.

The PRPs initiated the RI/FS in April 1987. In March 1990, a final RI was completed. The RI focused on the most heavily contaminated zone at the Site which included the contaminated soils, sludges and shallow groundwater down to the clay layer (hereinafter, this zone will be referred to as the "Fill Area"). The RI also collected data from the deeper groundwater areas. The deeper areas consist of the till aquifer, which lies just under the Fill Area's clay layer, and the bedrock aquifer which underlies the till aquifer. Groundwater within both the till aquifer and bedrock aquifer was found to be contaminated with site-related compounds. The RI also found that the adjacent Peach Island Creek's surface water and sediments were impacted by contaminants similar to those found in the Fill Area.

Prior to issuing a final RI, an FS was completed in 1989. Based on data from the draft RI, the FS analyzed alternatives for the Fill Area groundwater and sludge/soils. The alternatives analyzed included the combined use of a slurry wall, dewatering, caps, vacuum extraction and in-situ stabilization technologies. The results of the FS indicated that, although there seemed to be several potential methods or combinations of methods to remedy the Fill Area soil and sludges, there were uncertainties regarding the relative effectiveness of the various technologies. Consequently, EPA made a decision that treatment alternatives needed further assessment. In the meantime, interim measures were necessary to contain and prevent exposure to the Fill Area contaminants. Therefore, based on the findings, of the RI and FS, a Record of Decision (ROD) for an interim remedy for the Fill Area was issued by EPA in September 1990.

Interim Remedy: Soil and Shallow Groundwater on Property (OU1).

EPA typically addresses sites in separate phases and/or operable units. In developing an overall strategy for the SCP Site, EPA has identified the interim Fill Area remedy as Operable Unit 1 (OU1), the final Fill Area remedy as OU2, and the off-property groundwater/Peach Island Creek remedy as OU3.

As stated previously, EPA issued a ROD on September 14, 1990 describing the selection of an interim remedial action for the Fill Area to prevent exposure to site soils and prevent the spread of the contaminated groundwater within the Fill Area from migrating off the property. The interim

remedy was constructed from August 1991 through June 1992 by the PRPs for the Site pursuant to a Unilateral Administrative Order dated September 28, 1990 and consists of the following:

1. A lateral containment wall comprised of a soil-bentonite slurry with an integral high density polyethylene (HDPE) vertical membrane which is keyed into the clay layer and circumscribes the property;
2. A sheet pile retaining wall along Peach Island Creek. The retaining wall, which is still in place, was constructed to facilitate installation of the slurry wall;
3. A horizontal infiltration barrier consisting of high density polyethylene covering the property;
4. An extraction system for shallow groundwater consisting of seven (since reduced to five) wells screened in the Fill Area, which discharge to an above ground 10,000 gallon tank via above-grade pipes, The water from the tank is disposed of off-site;
5. A chain link fence which circumscribes the Property; and
6. Quarterly (since made annual) groundwater monitoring for metals and organics. Operation and Monitoring reports on the current conditions at the Site are submitted to EPA on a monthly basis.

The interim remedy has effectively mitigated the risks from direct contact and the spread of Fill Area contamination since its implementation in 1992.

OU2 and OU3

While implementing the interim remedy (i.e., OU1), EPA continued to oversee additional RI/FS work which would provide information to prepare Records of Decision for OU2 and OU3. In March 1994, the PRPs presented to EPA nine remedial technologies which the PRPs considered potentially applicable to the Site. In December of that year, EPA requested that the PRPs further review and reduce the list of potential technologies. In 1995, the PRPs submitted a Focused Feasibility Study Workplan (FFS) to evaluate both the off-property groundwater contamination (to be addressed in OU3) and the following reduced list of remedial technologies for the Fill Area; 1) containment; 2) "hot spot" removal; 3) stabilization; 4) bioremediation and 5) thermal desorption.

The FFS identified a number of severe limitations and complex issues associated with the site-wide ex-situ remedial options, including difficulties associated with the large amount of massive construction and demolition debris contained with the Fill Area. These findings are presented in detail in the 1997 Focused Feasibility Investigation Workplan (FFSI). The FFSI established the following working definition for the "hot spot" area:

- an area where, if chemical constituents were removed and/or treated, the site-wide risk would be reduced by over an order of magnitude; and
- an area small enough to be considered separately from remediation of the entire Fill Area.

Based on previous findings, it was determined that sludge in one portion of the Fill Area fit the definition of "hot spot" (see Figure 2). The FFSI also determined that treatability studies were necessary to determine the best in-situ methods to address this Fill Area sludge (i.e., the Hot Spot area). In 1998, the PRPs submitted a Treatability Testing Workplan to test these technologies. The results of the testing were submitted in the July 2000 Treatability Study Final Report.

Additional off-property groundwater and surface water sampling will continue to be conducted in preparation for the development of remedial alternatives for off-property groundwater contamination and Peach Island Creek. Based on the existing information relating to the Fill Area, EPA has elected to move forward with the permanent remedy for OU2 independent of the OU3 remedy, which will be the subject of a future ROD. Thus, the following summary focuses on the OU2 efforts.

SITE CHARACTERISTICS

The results of the RI indicate that the Site stratigraphy consists of the following units, in descending order with depth: earthen fill material (average thickness of approximately 8.4 feet across the Site); peat (thickness ranging from 0 to approximately 1.8 feet across the Site); gray silt (average thickness ranging from 0 to 19 feet across the Site); till (consisting of sand, clay and gravel, average thickness of approximately 20 feet across the Site); and bedrock.

The Site is underlain by three groundwater units which are described as the "shallow aquifer," the "till aquifer" and

the "bedrock aquifer" in descending order with depth. The natural water table is found in the shallow aquifer at a depth of approximately two feet below the land surface. The till aquifer consists of the water-bearing unit between the clay and the bedrock. The bedrock aquifer is the most prolific of the three aquifers and is used regionally for potable and industrial purposes. Results of hydrogeologic tests conducted during the RI indicate that the three aquifers are hydraulically connected. Chemical analyses of groundwater from the three aquifers provide further support to this finding. Specifically, chemical data collected during the RI demonstrated that contaminants, including chloroform, 1,2-dichloroethane, and vinyl chloride from the shallow aquifer have migrated across the clay-silt layer into the till and bedrock aquifers.

Physical Characteristics

Test pit and boring investigations conducted during the RI defined the Fill Area. Twenty-three test pits were dug and thirty-one soil borings were taken. In addition, eighteen soil borings were collected around the perimeter of the Site as part of the OU1 slurry wall design investigation. Based on these data, the following conclusions can be drawn.

1. The Fill Area material consists of a variety, of construction and demolition (C&D) debris including large blocks of reinforced concrete and rock, steel beams, timber, stumps, scrap metal, fencing, piping, cable, brick, ceramic, concrete masonry block, rock/concrete rubble, etc. Finer grained materials such as sands, gravels, silts, clays, and sludge-like material were identified mixed within the C&D debris.
2. Based on a review of the Test Pit Study Report and photographs of subsurface material, an estimated 60% of the material is C&D debris and the remaining material consists of finer grained particles mixed with the C&D debris.

Chemical Characteristics

During the RI, numerous chemical constituents were detected in the Fill Area material, including volatile organic compounds (VOCs) such as benzene, tetrachloroethylene and toluene; semi-volatile organic compounds (SVOC) (generally polynuclear aromatic hydrocarbons); a small number of pesticides such as aldrin and dieldrin; polychlorinated biphenyls (PCBs); and metals such as copper and lead.

Sludge Area Investigation

An investigation of a portion of the Fill Area was conducted pursuant to the 1997 FFSI Work Plan and was designed to gather data on the nature and extent of contaminated sludge in the vicinity of one of the RI's borings, namely boring B-1 (see Figure 2). This sludge area was later determined to meet the definition of a Hot Spot. Therefore, the terms "sludge area" and "Hot Spot" will be used interchangeably through the remainder of this Proposed Plan. The results of the FFSI are presented in the 1997 FFSI Report. In summary, the investigation confirmed the presence of a discrete area of sludge in the eastern portion of the Site with the following characteristics:

- The sludge area is approximately 4,000 square feet in areal extent and consists predominately of sludge material and fine grained soil with little debris. A surficial layer of fill approximately 0.5 to 8 feet thick overlies the sludge and, based on an average thickness of 10 feet the volume of sludge is approximately 1,480 cubic yards.
- The levels of contaminants for the sludge area include the highest VOC (e.g., tetrachloroethylene at 4290 ppm and toluene at 3380 ppm) and PCB (e.g. Arochlor 1242 at >15,000 ppm) concentrations detected anywhere on the SCP property.

WHAT IS A "PRINCIPAL THREAT"?

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

The contaminated soils and sludges in the Fill Area are considered to be "Principal threat wastes" as the chemicals of

concern are found at concentrations that pose a potential significant risk. The risk from the sludges in the Hot Spot Area are significantly higher than the remainder of the Site. In addition, the contaminants demonstrated a potential for off-site migration through surface water runoff, prior to placement of the interim cap.

SCOPE AND ROLE OF THE ACTION

As stated previously, EPA plans to address this Site in three operable units, one of which has already been implemented. OU1 provided an interim infiltration barrier, slurry wall, groundwater collection system and off-site treatment and disposal of extracted groundwater. OU2 improves upon and makes permanent the OU1 remedy and therefore addresses the final remedy for the Fill Area. OU3, the final operable unit, will address the contaminated groundwater in the deeper aquifers where contamination extends off-property. OU3 will also address the contaminated sediments in Peach Island Creek.

SUMMARY OF SITE RISKS

WHAT ARE THE "CONTAMINANTS OF CONCERN"?

EPA and NJDEP have identified PCBs, metals, and several organic compounds in soils and the groundwater directly under the Site as chemicals of concern as they pose the greatest potential risk to human health at this Site.

PCBs were found in Fill Area soils at a maximum concentration of 15,100 parts per million (ppm) in surface soil, 400 ppm in soils 4 to 6 feet deep, 1,400 ppm in soils 6-8 feet deep soils and 1,300 ppm in the deeper Fill Area soils. PCBs were also found in the shallow groundwater at a concentration of 17 milligrams per liter (ppm). PCBs are a group of 209 individual chlorinated biphenyl compounds (known as congeners) with varying health effects. PCBs are classified by EPA as probable human carcinogens. Some PCBs also have non-cancer health effects including reduced birth weight and impacts on the immune system.

VOCs were found in the soils and the groundwater within the shallow water table aquifer. Maximum total VOC concentrations in the fill area were 9,000ppm at 2 to 4 feet deep, 29,200ppm at 6 to 8 feet deep and 36,000ppm at 10 to 12 feet deep. The VOCs of concern include: tetrachloroethylene, 1,2-dichloroethane, 1,2-dichloroethylene (trans), methylene chloride; methyl ethyl ketone; trichloroethylene; and vinyl chloride. The VOCs of concern include a number of known human carcinogens (e.g., benzene and vinyl chloride); probable human carcinogens (e.g., chloroform and tetrachloroethylene); possible/probable human carcinogens (e.g. trichloroethylene); and possible human carcinogens (e.g., isophorone). In addition to their carcinogenic potential, these chemicals may also cause non-cancer health effects including impacts on the liver and blood at high doses.

Benzidine, which was found in one sample in the Hot Spot Area at 244.0 ppm, is a solid, previously used in production of dyes. Benzidine is classified by EPA as a known human carcinogen.

Metals found on the Site include arsenic and lead. Arsenic is a known human carcinogen while lead is classified as a probable human carcinogen. Lead has been shown to cause neurotoxicity in children.

Human Health Risks

In 1990, as part of the RI/FS, EPA conducted a baseline risk assessment for the Site to determine the potential current and future effects of contaminants on human health. The Toxicity data and risk assessment were updated in July 2000. The Site is zoned for industrial use and the exposure assessment reflects this land use.

Since the original risk assessment was conducted in 1990, there has been an interim remedy constructed to eliminate direct contact with contaminated soil and potential releases of contaminated soil into the air and to contain contaminated groundwater in the Fill Area, thereby reducing potential cancer risks and non-cancer health hazards. The updated baseline risk assessment of July 2000 focused on health effects from exposure in the absence of the interim remedy and assuming the potential use of the shallow aquifer for drinking water consumption. This approach, therefore, may overestimate risks based on the current interim remedy already in place and the fact that groundwater from the shallow aquifer is not currently used for any drinking water purpose. In accordance with EPA's policies, based on the classification of the shallow groundwater by NJDEP as a potable drinking water source, an assessment of potential use of the shallow groundwater was performed to determine the extent of risks posed by this groundwater if no remedial action was taken.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates the "baseline risk." This is an estimate of the likelihood of a health problem occurring if no clean up actions were taken at a site. To estimate this baseline risk at a Superfund site, a four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure (RME) scenarios and central tendency exposure (CT) scenarios.

Data Collection and Evaluation/Hazard/Identification: In this step, the data which have been gathered at the site are assessed, and the contaminants of concern at the site are identified based on several factors such as toxicity, frequency of occurrence, and concentration of contamination in various media.

Exposure Assessment: Under this step, the different ways that people might be exposed to the contaminants identified in the previous step, such as ingestion of contaminated soil or groundwater, inhalation of contaminated air, and ingestion of contaminated fish, are identified. Also, the concentrations to which people might be exposed, and the potential frequency and duration of exposure are considered. Using this information, the "reasonable maximum exposure" scenario, which identifies the highest level of human exposure that could reasonably be expected to occur, and the "central tendency" scenario, which represents the average human exposure, are evaluated.

Toxicity Assessment: The toxicity assessment determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Two distinct types of health effects are considered, carcinogenic effects, and non-carcinogenic, or systemic, effects.

Risk Characterization: This step summarizes and combines the results of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Two types of risk—cancer risk and non-cancer hazards are evaluated. The likelihood of any kind of cancer resulting from a site is expressed as a probability. For example, a 10^{-4} cancer risk means that one additional person may develop cancer within a population of 10,000 people exposed under conditions identified in the exposure assessment. Superfund law states that acceptable exposures are an individual lifetime excess carcinogenic risk in the range of 10^{-6} to 10^{-4} (corresponding to a one-in-one-million to a one-in-ten-thousand excess lifetime risk of developing cancer). For non-cancer health effects, a "hazard index" (HI) is calculated which looks at exposure to multiple chemicals through multiple exposure pathways (such as ingestion of and dermal contact with contaminated soils). The key concept here is that a "threshold level" (measured as an HI of less than 1)

The cancer risks and non-cancer hazards were evaluated for future adult on-site workers; future construction workers; future adolescent trespassers; further off-site workers; and future adult and child off-site residents. It should be noted that the nearest off-site resident is currently over one mile from the Site. The potential exposure pathways evaluated included: ingestion and dermal contact with contaminated surface and subsurface soils; inhalation of volatilized contaminants and dust, and ingestion of shallow groundwater.

There are numerous chemical contaminants present in the Site soils. To determine which chemicals were of concern at the Site for purposes of the risk assessment, each chemical detected was compared against criteria that included

potential toxicity, and frequency of detection. The chemicals of concern were found to be associated with the recycling of industrial wastes during the 1970's and early 1980's. The above contaminants of concern found at the Site are evaluated in the risk assessment. For known or suspected carcinogens, EPA has established an acceptable cancer risk range of one-in-a-million (1×10^{-6}) to one-in-ten-thousand (1×10^{-4}). Action is generally warranted when excess lifetime cancer risk exceeds one-in-ten-thousand. In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could develop cancer than would normally be expected. NJDEP's acceptable risk level is 1×10^{-6} .

EPA's guidance for evaluating risk from exposure to carcinogenic chemicals provides a framework for assessing carcinogenic risks. This process includes estimating the potential risk throughout an entire exposure period of 250 days/year for 25 years for the workers who may be exposed through incidental ingestion, dermal contact, and inhalation of contaminants. EPA used standard default assumptions including that individuals would be exposed to the maximum detected concentration of each contaminant in the absence of the current interim remedy at the Site. EPA's risk analysis indicates that the total cancer risks to the reasonably maximally exposed individual are 1.5×10^{-2} with the primary risks associated with exposure to PCBs for 250 days/year for a period of 25 years. The cancer risks for the average exposure is approximately 4×10^{-3} based on an exposure period of 220 days/year for 6.6 years. Both risks are greater than EPA's acceptable risk range and are primarily due to exposures to Hot Spot Area PCBs.

For the future construction worker, who would be exposed for a significantly shorter period of time (i.e., 180 days for 1 year) while digging in the contaminated soils at a depth of 5 to 6 feet, the cancer risks for the reasonably maximally exposed individual are approximately 2.8×10^{-3} . This is above EPA's acceptable risk range. The risks are primarily the result of exposure to benzidine, and PCBs found in the Hot Spot Area. The risks to the reasonably maximally exposed individual exposed to the deep and very deep soils at the Site are approximately 8.0×10^{-6} and 2.5×10^{-6} , which are within EPA's acceptable risk range.

For a future adolescent who may come into contact with the contaminated soils while trespassing at the Site, the risks were approximately 2.0×10^{-3} for the reasonably maximally exposed individual and 5.0×10^{-4} for the average exposure. Consistent with EPA's regulations, this assessment does not take into account the interim remedy which is in place at the Site. Again, the potential risks are primarily the result of exposure to Hot Spot Area PCBs.

For a future site worker, in the highly unlikely event that the shallow aquifer was used as a drinking water supply for on-site workers, the cancer risks are approximately 4.0×10^{-1} . The primary chemicals contributing to this unacceptable risk are: chloroform, 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethylene, methylene chloride, trichloroethylene, vinyl chloride, total PCBs, and arsenic.

Risks to off-site workers potentially exposed through inhalation of wind eroded soil and volatilized chemicals, not considering the interim remedy that is in place at the Site, are approximately 2.0×10^{-6} which is within EPA's acceptable risk range. An analysis of risks to off-site residents exposed through inhalation of wind eroded soil and volatilized chemicals in the future, assuming that the interim remedy was not in place, were found to be below 1.0×10^{-6} and therefore within EPA's acceptable risk range.

The risk assessment also evaluated non-cancer health effects to the same populations evaluated during the cancer assessment above. Once again, EPA used standard default assumptions and followed regulations which assume that individuals would be exposed in the absence of the current interim remedy at the Site, and to the maximum detected concentration of each contaminant. The non-cancer assessments are based on current reasonable maximum exposure scenarios and were developed taking into account various assumptions about the frequency and duration of an individual's exposure to the subsurface and surface soils as well as the toxicity of the contaminants of concern. For the non-cancer assessment, the exposure dose is compared to a Reference Dose that is designed to be protective of the general population including adults and children. The exceedence of a Hazard Quotient of 1 indicates an increased level of concern.

For the on-site worker, assuming the current interim remedy to

reduce exposure was not in place, the Hazard Index (HI) for the reasonably maximally exposed individual exposed through incidental ingestion and dermal exposure is 310. This is based on non-cancer hazards from PCBs. The HI for the average exposed individual is 110 and this is based on the total Hazard Index from PCBs.

For the future construction worker exposed to the subsurface soils (at 5 to 6 foot depth), the non-cancer HI is 32 for the reasonably maximally exposed individual. The primary contaminant of concern is PCBs. At greater depths, the HI is less than 1.

For the future trespasser exposed to surface soils in the absence of the current on-site interim remedy, the HI is 234 based on PCBs.

For the future on-site worker who may be exposed to the shallow groundwater through ingestion, the HI is 4,800 for the reasonably maximally exposed individual and 3,000 for the central tendency or average exposed individual. This hazard assessment assumes that the shallow groundwater would be used as a drinking water supply although it is highly unlikely that this section of the aquifer would support this activity based on yield, but it was evaluated consistent with EPA's guidance. The primary chemicals contributing to this risk are the volatile organic chemicals including benzene, chloroform, 1,2-dichloroethane, vinyl chloride, nitrobenzene, 1,2-dichloroethylene (trans), tetrachloroethylene, methylene chloride, methyl ethyl ketone, and trichloroethylene. Arsenic also contributed to the hazard, however, the most significant single contributor to the total hazard was PCBs (HI = 2,400) in the Hot Spot Area.

It is EPA's, as the lead agency, current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan,

| SUMMARY OF SOIL REMEDIAL ALTERNATIVES | | |
|---------------------------------------|-----------------------------|--|
| Medium | Source Control Alternatives | Description |
| SOIL | SC-1 | No Action |
| | SC-2 | Excavation/Ex-situ Treatment/Disposal of Fill Area Soils |
| | SC-3 | Excavation of Hot Spot Area, Capping, and Shallow Groundwater Collection |
| | SC-4 | In-Situ Thermal Desorption of Hot Spot Capping and Shallow Groundwater Collection. |
| | SC-5 | Air Stripping, Solidification/Stabilization of Hot Spot, Capping and Shallow Groundwater Collection. |

is necessary to provide permanent protection of public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Ecological Risks:

An ecological risk assessment was determined to be unnecessary for the on-site remedy. Thus, the potential ecological risks will be addressed as part of OU3.

REMEDIAL ACTION OBJECTIVES

The following remedial action objectives address the human health risks and environmental concerns posed by the SCP Fill Area by:

- Mitigating direct contact risk and leaching of contaminants from soil, fill material and sludge into the ground water;
- Reducing the toxicity and mobility of the Hot Spot contaminants via treatment;
- Providing hydraulic control of the shallow aquifer by maintaining groundwater levels within the slurry wall below the corresponding levels in piezometers outside the slurry wall, and extracting and treating the shallow groundwater; and
- Performing remediation in such a manner that allows site re-use for commercial purposes.

SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives for the soils are presented below. Because all of the alternatives may result in contaminants remaining on the Site at levels above those that would allow for unrestricted use, five-year reviews will be required in perpetuity. In addition, all of the alternatives will require some form of institutional controls (e.g., deed notice) because none of the alternatives will allow the site to be used for residential purposes. Some of the alternatives may also require limitations on the type of intrusive activities that can be conducted on-site. The timeframes below for construction do not include the time for remedial design or the time to procure contracts.

Alternative SC-1: No Action

| | |
|----------------------------------|------|
| Estimated Capital Cost | \$0 |
| Estimated Annual O&M Cost | \$0 |
| Estimated Present Worth Cost | \$0 |
| Estimated Construction Timeframe | None |

Regulations governing the Superfund program require that the “no action” alternative be evaluated generally to establish a baseline for comparison. Under this alternative, EPA would take no action at the Site to prevent exposure to the soil contamination. The contaminated soil would be left in place without treatment. As the interim remedy was not designed to be permanent, EPA expects that it would eventually fail. This could allow on-site exposure as well as an increased possibility that additional contamination would migrate from the Fill Area.

Alternative SC-2: Excavation/Ex-situ Treatment/Disposal

| | |
|----------------------------------|--------------|
| Estimated Capital Cost | \$91 million |
| Estimated Annual O&M Cost | \$100,000 |
| Estimated Present Worth Cost | \$94 million |
| Estimated Construction Timeframe | 2 years |

All the contaminated soil, sludge and debris in the entire Fill Area would be removed and sent off-site for treatment or disposal. The mix of large debris and soil found in the fill area would be separated by size and composition and stockpiled on-site. Extensive dewatering activities would be conducted prior to and during any excavation activities. A sheet pile wall would be installed around the entire Fill Area to allow the excavation and removal of the majority of Fill Area debris and soil while protecting the existing slurry wall. Control of VOC vapor and dust, as well as air monitoring would need to be provided as would control of run-off due to precipitation. The Fill Area would be backfilled with clean fill and regraded. As all contaminated soils, sludges and debris would be excavated and contaminated groundwater pumped out during the dewatering process, neither the existing nor additional containment measures would be necessary.

Alternative SC-3: Excavation of Hot Spot Area, Capping, and Shallow Groundwater Collection

| | |
|----------------------------------|----------------|
| Estimated Capital Cost | \$13.9 million |
| Estimated Annual O&M Cost | \$180,000 |
| Estimated Present Worth Cost | \$16.7 million |
| Estimated Construction Timeframe | 13 Months |

The Hot Spot area sludge would be excavated and sent off-site for treatment (incineration) and disposal. Dewatering activities would be conducted prior to and during the excavation activity with off-site treatment and disposal of the groundwater. A braced excavation using sheet piles supported by at least two levels of internal bracing would be required to provide a stable excavation and to protect the integrity of the existing slurry wall, which is within 10 feet of the sludge at

some locations. In order to provide a stable excavation and limit emissions, the sludge area would need to be excavated in multiple "cells" rather than a single large excavation. Each

cell would be backfilled with imported clean fill before excavating the adjoining cell. During excavation, VOC and dust emissions, and odor would need to be controlled to protect nearby off-site receptors and the general public. To achieve the necessary control, excavation activities would likely need to be completed within a fully enclosed structure so that all VOC and dust emissions could be collected and treated prior to discharging to the atmosphere.

The cap will consist of a 2-foot thick "double containment" cover system, which will be constructed over the entire area currently circumscribed by the existing slurry wall. The cover system will provide flexibility for the potential end-use of the site for commercial purposes.

In order that hydraulic control within the existing slurry wall is maintained, the existing, interim groundwater recovery system, which consists of above ground piping, seven wells screened in the Fill Area which discharge to a 10,000 gallon on site holding tank, would be improved. The improvements would include the installation of new extraction wells along the perimeter of the Site, construction of underground clean utility corridors for the wells, and piping and electrical system to allow more flexibility for future uses of the Site. A geotextile would be placed within the utility corridor to separate Fill Area soils from clean soils within the utility corridors. The extracted groundwater would either be collected in the existing 10,000 gallon above-ground tank for disposal via tanker truck at a commercial facility, or pumped, via sewer connection, to the Bergen County Publicly Owned Treatment Works (POTW) for treatment.

Currently, a sheet pile wall along Peach Island Creek protects the slurry wall along the riparian side of the Fill Area. Improvements would be made to the sheet pile wall which could include the installation of slope stabilization material such as rip-rap and the geomembrane portion of the cover would be extended down the graded and protected slope. The existing slurry wall would remain in place.

The slurry wall includes a double containment system consisting of a soil-bentonite slurry barrier and a geomembrane barrier. The slurry wall is keyed into the natural clay layer underlying the Fill Area. For this alternative, as well as Alternatives SC-4 and SC-5, the effectiveness of the slurry wall would continue to be monitored by shallow groundwater wells outside the slurry wall.

Alternative SC-4 In-Situ Thermal Desorption, Capping, and Shallow Groundwater Collection

| | |
|----------------------------------|----------------|
| Estimated Capital Cost | \$ 4.7 million |
| Estimated Annual O&M Cost | \$180,000 |
| Estimated Present Worth Cost | \$ 7.5 million |
| Estimated Construction Timeframe | 1 year |

In-situ thermal desorption of the Hot Spot Area could be achieved via installation of thermal wells, consisting of a perforated outer steel casing and interior heating element in a closely spaced pattern throughout the area. A heat resistant silica blanket would be placed over the area forming a seal to minimize losses of VOCs and steam, as well as to reduce intrusion of atmospheric air. The wells and an approximately 6-inch wide concentric halo would be heated to 1,400° F. Heat propagating throughout the area would first vaporize moisture, and then increase sludge temperatures to around 450°F (sufficiently high to cause PCBs to desorb from the soil). A modest vacuum (3 to 5 inches water) would be applied to each well in the system to remove vapors. Extracted vapors would be treated by an indirect fired thermal oxidizer at ground surface followed by a heat exchanger and a vapor phase activated carbon (VPAC) system.

A description of the capping and groundwater collection that would be performed for this alternative can be found in the description of alternative SC-3.

Alternative SC-5: Air Stripping, Capping, Solidification/Stabilization and Shallow Groundwater Collection.

| | |
|----------------------------------|----------------|
| Estimated Capital Cost | \$ 4.7 million |
| Estimated Annual O&M Cost | \$180,000 |
| Estimated Present Worth Cost | \$ 7.5 million |
| Estimated Construction Timeframe | One Year |

For this alternative, the key elements of the existing interim remedy would be improved and made permanent. In addition, in-situ (i.e., in place) treatment followed by solidification/stabilization of the Hot Spot Area would be performed.

The Hot Spot Area would first be treated, in-situ, via air stripping, which in this case would be effected by aerating the Hot Spot Area with augers or paddles. During operation of the selected air stripping method, small shrouds will be placed directly over the augers or paddles and negative pressure would be maintained within the shroud to capture the VOCs released during mixing. VOCs released from the Hot Spot Material would be treated using vapor phase activated carbon, a catalytic oxidizer or other appropriate technologies. Cement

and lime, which the treatability studies showed to be effective in stabilizing the PCBs and VOCs, would be used as the solidification and stabilization agent. Treatment is expected to extend at least two feet below the natural ground surface, which would be 10-18 feet below existing ground surface.

This action would be followed by capping and groundwater collection as described in Alternative SC-3.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against one another in order to select the best alternative. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. A more detailed analysis of the presented alternatives can be found in the FFS.

1. Overall Protection of Human Health and the Environment

All of the alternatives except the "no action" alternative would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment engineering controls, and/or institutional controls. Alternatives SC-5 and SC-4 would afford protection by treating and stabilizing the most highly-contaminated area, (i.e., the Hot Spot Area). Alternative SC-3 would provide protection by removing the most highly-contaminated area for off-site treatment or disposal. Alternatives SC-3, SC-4 and SC-5 would all provide additional protection by preventing direct contact exposure with contaminated soils and preventing the spread of contaminants to outside the Fill Area by containing the area with a slurry wall, cap, and groundwater collection system. Alternative SC-2 would remove for disposal or treatment the majority of the contaminated material in the entire Fill Area, thereby removing unacceptable risks once the cleanup is complete.

2. Compliance with ARARs

Actions taken at any Superfund site must meet all applicable or relevant and appropriate requirements (ARARs) of federal and state law, or provide grounds for invoking a waiver of these requirements. These include chemical-specific, location specific and action-specific ARARs.

Soils

There are no chemical-specific ARARs for the contaminated

soils. If SC-2 is selected, risk-based cleanup goals for the Fill Area would be developed using the New Jersey Soil Clean-up Criteria (NJSCC) which are To Be Considered (TBC) criteria as opposed to promulgated standards. There are three types of NJSCC, Residential Direct Contact (RDSCC), Non-Residential Direct Contact (NRDCSCC), and Impact to Groundwater (IGWSCC). Since the Site is located in a non-residential/commercial area the more stringent of the NRDCSCC or the IGWSCC would be used to develop soil clean-up goals.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and the Proposed Plan.

Alternatives SC-3, SC-4 and SC-5, while not remediating or removing Fill Area soils outside the Hot Spot Area, would greatly (by over an order of magnitude) reduce the risk levels posed by the Fill Area soils, through treatment or removal of the most contaminated area. In addition, Alternatives SC-3, SC-4 and SC-5 would, through containment monitoring and institutional controls, mitigate the potential risks from the Site and therefore comply with NJSCC.

All the alternatives will comply with the substantive New Jersey's Technical Requirements for Site Remediation, N.J.A.C. 7:26E *et. seq.*, the New Jersey Brownfield and Contaminated Site Remediation Act, N.J.A.C. 58:10B and any relevant local requirements including the Hackensack Meadowlands Development Commission regulations.

The Resource Conservation and Recovery Act (RCRA) is a federal law that mandates procedures for treating, transporting, storing and disposing of hazardous substances. All portions of RCRA that were applicable or relevant and appropriate to the proposed remedy for the Site would be met by Alternatives SC-2 through SC-5.

Groundwater

Alternatives SC-3, SC-4 and SC-5 require that groundwater within the Fill Area be pumped and sent off-site, which in combination with the slurry wall and natural clay layer would prevent the spread of contaminants to the surrounding areas or surface water thereby preventing any direct

exposure to contaminated water. Therefore, these remedies will not contravene Surface Water Quality Standards (NJAC 7:9B) or Ground Water Quality Standards (NJAC 7:9-6) outside the Fill Area. In addition, since the Groundwater Quality Standards will not be met within the Fill Area, a Classification Exception Area (CEA) would need to be established for any of the Alternatives.

3. Long-term Effectiveness and Permanence

Alternative SC-1 would provide no long-term effectiveness and permanence in the prevention of direct contact to or spread of Fill Area contamination. Alternatives SC-3, SC-4 and SC-5 are all effective in the long-term as they would reduce potential risks due to ingestion and dermal contact pathways and minimize any potential of contamination impacting groundwater outside the Fill Area. However the cap, slurry wall, groundwater pumping system and monitoring wells would require regular inspection and maintenance to ensure the integrity of the remedy over the long-term. Alternative SC-2 would not require long term control as soils above risk-based cleanup levels would be removed from the Site.

4. Reduction of Toxicity, Mobility or Volume of Contaminants Through Treatment

Alternatives SC-4 and SC-5 would reduce the concentration as well as the toxicity and mobility of a large percentage of the contaminants in the Fill Area through treatment of the to highly-contaminated Hot Spot Area. SC-5 would also

stabilize any remaining contamination in the Hot Spot Area, but would increase the volume of the Hot Spot Area by approximately 10% through the addition of stabilizing substances. SC-3 would reduce the toxicity, mobility and volume and toxicity of the contaminants in the Fill Area through direct removal of the entire Hot Spot Area. For SC-3, SC-4 and SC-5, mobility would be reduced over the whole Fill Area through installation of a permanent cap. Alternative SC-2 would offer the greatest reduction in toxicity, mobility and volume of contaminants compared to the other alternatives by removing material for off-site treatment or disposal, thereby eliminating unacceptable risks on-site.

5. Short-term Effectiveness

All the remedial alternatives would involve some Site disturbance and thus present the potential for short-term challenges. SC-3 may require construction of a large tent over a portion of the site to ensure that the high concentration of VOCs that exist on-site are not released into the air during the excavation activities. Regardless, implementation of SC-3, even with available controls in place, could cause significant health risks to workers, off-site receptors and the public. SC-4 would require the installation and operation of high temperature thermal elements and would also allow for the potential of VOC releases, Hydrogen Chloride (HCl) production and fouling due to the destruction of oil-based products. The effectiveness of this action is uncertain due not only to the presence of oil in the Hot Spot Area, but also the very high water content in this area. SC-5 would require control of VOC release during the air stripping remedial action through the use of small shrouds. SC-3, SC-4 and SC-5 would use the capping/slurry wall/groundwater collection methods to contain the wastes in the Fill Area. These methods have been shown to be effective during 8 years of operation for the interim remedy. Alternative SC-2 would require the most excavation, and would also require extensive stockpiling and separation of the on-site soil and debris. Implementation of SC-2 and SC-3 would require additional truck traffic in the industrial area around the Site, which would have to be coordinated as to lessen the impacts to normal area traffic.

6. Implementability

Implementation of Alternative SC-2 would require surmounting many technical and potential human exposure problems. Approximately 99% of the VOC and dust emissions would have to be controlled in order to protect against a potential "worst-case" off-site human exposure scenario. This would likely require excavation and material handling activities for the entire Site to be conducted within an enclosed structure. Emission from the enclosure may require treatment prior to being discharged to the atmosphere. In addition, the large and varied amount of soil and debris found in the Fill Area, including wood, plastic, metal, cement, saturated and unsaturated soils etc., would require extensive manual labor to separate and would require

a large number of on-site stock piles in a relatively small area.

Alternatives SC-3, SC-4 and SC-5 would improve and make permanent the existing interim remedy. A new slurry wall would not need to be constructed, however, a new cap, stream bank stabilization along Peach Island Creek, piping for groundwater collection, and additional monitoring wells would be constructed or installed. The methods for this work are well known and equipment is readily available.

Implementation of Alternative SC-3 would entail significant challenges. Construction risks, due to the instability of the sludge area soils, and the risk of contaminant migration during construction activities are significant. Also, significant effort would be needed to prevent escape of VOCs during the excavation and there would be added risk associated with transporting the sludge to the nearest available treatment and disposal facilities. Additionally, limitations on the rate of acceptance of the sludge at a disposal area could significantly impede the progress of this remedial action.

Implementation of SC-4 could be problematic due to the high moisture content of the sludge. This could lead to extended treatment times since virtually all moisture must be vaporized before sludge temperatures increase and allow contaminant desorption. Calculations indicated that large quantities of HCl would be generated, giving rise to concerns that HCl could react with metals forming more soluble compounds (salts) that would be more mobile than the metal compounds which currently exist at the Site. In addition, the high concentrations of petroleum-based oils could cause repeated fouling of the thermal system which in turn would reduce the overall efficiency of the wells to extract vapors and control potential releases at the surface.

The Alternative SC-5 treatment process using air stripping and stabilization/solidification are relatively well known technologies. This treatment proved effective during treatability studies using sludge from the Hot Spot Area, where concentrations of VOCs were reduced by 90% and mobilization of PCBs and VOCs were reduced by over 95%. The potential of VOC release during aeration and spread of the contaminants during implementation of this alternative is far less than for either Alternative SC-3 and SC-2. Nevertheless, these risks would need to be addressed during the remedial action.

7. Cost

The estimated present worth cost of SC-2 is significantly more

than SC-3. And SC-3 is approximately twice SC-4 or SC-5. The costs for the latter two alternatives are comparable as are the implementation timeframes.

8. State/Support Agency Acceptance

The State of New Jersey agrees with the preferred alternative in this Proposed Plan.

9. Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD for the Site.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for cleaning up the Fill Area at the SCP Site in Carlstadt, New Jersey is Alternative SC-5 (Air Stripping, Capping, Solidification/Stabilization and Shallow Groundwater Collection), hereafter referred to as the Preferred Alternative. While EPA believes the Hot Spot treatment described in SC-5 will be effective, as in any remedial action, if appropriate performance standards for treatment, solidification and containment are not met then removal of the Hot Spot as described in SC-3, will be performed.

The Preferred Alternative was selected over the other alternatives since it is readily implementable, and it is expected to achieve reduction in the VOC concentration and stabilization and containment of the inorganic and PCB contamination in the most highly-contaminated area (i.e., the Hot Spot). In addition, containment, which is the key element of the Preferred Alternative, improves on the interim remedy to make it viable on a long-term basis to reduce the potential of risk from contaminants that will remain in the Fill Area. The containment measures implemented in the interim remedy have proved effective during the remedy's entire eight years of operation. The Preferred Alternative greatly reduces the potential existing risk through treatment of the most highly-contaminated area, while improving on the existing effective remedy for soils and groundwater currently in place.

Based on the information available at this time, EPA and NJDEP believe the Preferred Alternative would be protective of human health and the environment, would be cost effective, and would use permeant solutions and alternative treatment technologies to the maximum extent practicable. Because it would treat the portion of the source material constituting principal threats, the preferred alternative meets the statutory preference for the selection of a remedy that involves treatment as a principal element. The

preferred alternative may change in response to public comment or new information.

COMMUNITY PARTICIPATION

EPA and NJDEP provide information regarding cleanup of the SCP Site to the public through public meetings, the Administrative Record File for the Site and the announcements published in the Star Ledger New Jersey newspaper. EPA and NJDEP encourage the public to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at the Site.

The dates for the public comment period; the date, location, and time of the public meeting, and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan

For further information on the SCP site, please contact:

Jon Gorin
Remedial Project
Manager
(212) 637-4361
gorin.jonathan@epamail.epa.gov

Pat Seppi
Community Relations
Coordinator
(212) 637-3679

U.S. EPA
290 Broadway 19th Floor.
New York, New York 10007-1866

ATTACHMENT B
PUBLIC NOTICE

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**UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY**
announces

**PROPOSED REMEDIAL ALTERNATIVES
for the
Scientific Chemical Processing Superfund Site
Carlstadt, New Jersey**

The U.S. Environmental Protection Agency (EPA) in cooperation with the New Jersey Department of Environmental Protection recently completed a Proposed Plan that evaluates remedial alternatives for the Scientific Chemical Processing (SCP) Superfund site in Carlstadt, New Jersey. The Proposed Plan is offered to inform the public of EPA's preferred remedy and to solicit public comments pertaining to all of the alternatives evaluated, as well as the preferred alternative.

EPA will consider written and oral comments on the proposed alternatives before selecting a final remedy. All comments must be received on or before September 15, 2001. The final decision document will include a summary of public comments and EPA responses.

EPA will hold an informational public meeting on Thursday, August 23, 2001 at 7:00 p.m. at the Carlstadt Municipal Building, 500 Madison Street, Carlstadt, NJ. At the meeting, EPA will discuss the Proposed Plan, including the preferred alternative.

The Proposed Plan evaluates five remedial alternatives for addressing the contamination associated with soils on the site. These alternatives are:

- SC1. No Action
- SC2. Excavation/Ex-situ treatment/Disposal
- SC3. Excavation of Hot Spot Area/Capping, and Shallow Groundwater Collection
- SC4. In-Situ Thermal Desorption, Capping and Shallow Groundwater Collection
- SC5. Air Stripping, Solidification/Stabilization, Capping and Shallow Groundwater Collection

EPA recommends Alternative SC5 since it would be protective of human health and the environment, would be cost effective, and would use permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it would treat the portion of the source material constituting principle threats, the preferred alternative meets the statutory preference for the selection of a remedy that involves treatment as a principle element.

The Proposed Plan, Remedial Investigation and Feasibility Study, and all other site related documents are available for review at the William E. Dermody Free Public Library, 420 Hackensack Street, Carlstadt, New Jersey. The phone number for the library is (201) 438-8836.

Written comments on the proposed alternative, as well as any of the alternatives considered should be sent to Mr. Jonathan Gorin, Project Manager, U.S. Environmental Protection Agency, 290 Broadway, 19th Floor, NY, NY 10007. Written comments must be received at the above address on or before September 15, 2001.

THE RECORD

FRIDAY, OCTOBER 12, 2001

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U.S. ENVIRONMENTAL PROTECTION AGENCY REGION II INVITES PUBLIC COMMENT

Proposed Cleanup to the Scientific Chemical Processing Superfund Site, Carlstadt, Bergen County, New Jersey

The United States Environmental Protection Agency (EPA) announces an extension of the public comment period for the Proposed Plan for the Scientific Chemical Processing Site's (the Site) second operable unit. The comment period now ends on October 23, 2001. As part of the public comment period, EPA held a public meeting on August 23, 2001, 7:00 p.m., in the Carlstadt Borough Hall, Carlstadt, NJ.

The Site's proposed Plan identifies a Preferred Alternative for the final remedy for the contaminated soil on the Scientific Chemical Processing Site. In addition, this Plan includes summaries of the other alternatives evaluated for use at this Site. The preferred alternative calls for improving and making permanent the key elements of the Site's existing interim remedy. In addition, in-situ (i.e., in place) treatment followed by in-situ solidification/stabilization of the Hot Spot Area would be performed. Finally, institutional controls in the form of deed notices will be established in order to ensure long term protectiveness of the containment system.

A copy of the Proposed Plan and the Site's Administrative Record can be found at the William E. Dermody Free Public Library, 420 Hackensack St, Carlstadt, NJ or the US EPA Records Center, 290 Broadway New York, NY.

Before selecting a final remedy, EPA and the New Jersey Department of Environmental Protection will consider all written and oral comments on this preferred remedy. All comments must be received on or before October 23, 2001. The final decision document, or Record of Decision, will include a summary of public comments and EPA's response.

The public may submit written comments through October 23, 2001 to:

Jon Gorin
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866

ATTACHMENT C
PUBLIC MEETING TRANSCRIPTS

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STATE OF NEW JERSEY

IN THE MATTER OF THE
SCIENTIFIC CHEMICAL PROCESSING
SUPERFUND SITE'S PROPOSED PLAN for
OPERABLE UNIT 2

Public Meeting
August 23, 2001
7:20 p.m.
Carlstadt Borough Hall
500 Main Street
Carlstadt, NJ 10027

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EPA PANEL:

Pat Seppi, Moderator, Community Involvement
Coordinator

John Gorin, Site Project Manager

Stephen Finn, Facility Coordinator,
Golder Associates

Kim O'Connell, Section Chief of the
Superfund Program

Marian Olsen, Human Health Risk Assessor

COUNCIL OF CARLSTADT:

William Roseman, Mayor

Paul G. Rizzo, Councilman

Robert J. Simmermann, Councilman

Joseph T. Crifasai, Councilman

Craig Lahullier, Councilman

Paul J. Occhiuzzo, Councilman

Jane Fontana, Business Administrator

Claire Foy, Borough Clerk

John J. Fahy, Esq., Borough Attorney

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PUBLIC MEETING

1
2 MS. SEPPI: Why don't we get
3 started. I appreciate you being here on time,
4 and if anyone comes in, I'm sure we can catch
5 them up as we go along.

6 My name is Pat Seppi. I'm
7 community involvement coordinator for the
8 Chemical Scientific Processing site, and I would
9 also like the people who are here with us tonight
10 to stand up and introduce themselves and tell you
11 how they are involved in this site also.

12 MR. GORIN: I'm John Gorin.
13 I'm EPA project manager for the site.

14 MS. O'CONNELL: Kim
15 O'Connell. I'm a section chief of the SuperFund
16 Program work on the site.

17 MS. OLSEN: I'm Marian
18 Olsen. I'm the human health risk assessor for
19 the site.

20 MR. FINN: Stephen Finn. I'm
21 with the firm of Golder Associates. We are
22 consultants for the responsible party group for
23 the cleanup of the site.

24 MS. SEPPI: And, Jane, is
25 there anyone here you would like to introduce

PUBLIC MEETING

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from the town?

MS. FONTANA: I would like to introduce Mayor Roseman, Councilman Craig Lahullier and Councilman Robert Simmermann, and I'm Jane Fontana, the town administrator.

MS. SEPPI: The reason we are here tonight is to share our proposed plan for the final cleanup for the site, and I hope that everybody either has gotten a copy or took a copy from outside.

The EPA has identified the alternative that we prefer, but before we make that decision in a final legally binding document, we have a public comment period of 30 days.

Now, the public comment period is scheduled to close on September 13th. So any comments we hear tonight, we will put that in the public record here. That's why we have Michael here. He is a stenographer. So all your comments will be duly noted. But if you think of anything else tonight, you can certainly write your comments to John Gorin on the address of the plan, but we ask that you do that by the close of

PUBLIC MEETING

1
2 business on September 13th.

3 We have just a couple of
4 short presentations tonight. We don't want to
5 keep you here too long, and then we will
6 certainly open up the floor to you for questions.

7 If you haven't signed in, I
8 would appreciate if you did that so we can add
9 you to the mailing list.

10 As I said, the copies of the
11 proposed plan are out there. If you do come up,
12 if you have questions and comments, if you state
13 your name first so Michael will be able to get
14 that for the record.

15 I asked Michael not to stop
16 if there is a word that he didn't get, or a
17 comment, or question, or anything.

18 So I think right now I will
19 turn this over to John and his presentation.

20 MR. GORIN: I'm just going to
21 do two things tonight on the agenda. I'm first
22 going to tell you a little bit about the
23 Superfund program itself, how it works, and the
24 second part I'm going to go into a little bit of
25 background and site history. A lot of questions

PUBLIC MEETING

1
2 might come up when I am going through the
3 background of the site and site history and what
4 happened.

5 I believe Steve Finn, who is
6 going to go after me, who is in charge of the
7 actual cleanup, will maybe answer those
8 questions, so you might want to wait until after
9 he's done. And if he didn't answer your
10 question, you can deal with it then.

11 How the Superfund program
12 works, well, first, site discovery. We
13 find--someone identifies the EPA of an abandoned
14 site or controlled site and that's when the
15 process begins.

16 The next step is the
17 preliminary assessment, when the EPA, and usually
18 the state, review all existing information on the
19 site to see if any other work has to be done.
20 The decision is made if additional work has to be
21 done.

22 We do a site inspection,
23 which is where we actually go and collect site
24 data. Based on that information, the accumulated
25 information during the assessment and the

PUBLIC MEETING

1
2 additional information collected during the
3 inspection, we give the site a hazard rank.

4 Based on the hazard rank, we
5 make a decision whether it will be placed on the
6 NPL list, which is the National Priority List, or
7 not. If it comes out on the National Priority
8 List, that's basically a Superfund list, all
9 those sites on that list are the Superfund sites
10 and it was what the EPA considers the most
11 uncontrolled abandoned sites in the nation. And
12 for all those sites a decision has to be made
13 what further action there should be, if anything.

14 The next step is to do a
15 remedial investigation and feasibility study.
16 These are generally done together. And this is
17 also when we all look for something called the
18 PRP, which is the Potentially Responsible Party,
19 or parties. And they are the ones that we feel
20 are responsible for the cleanup because they are
21 responsible for the pollution.

22 And if we find those
23 responsible parties, generally what we try to do
24 is get them involved, offer them a chance to do a
25 remedial investigation, or sometimes force them

PUBLIC MEETING

1
2 legally to do an investigation and feasibility
3 study.

4 If we don't find them, the
5 EPA does it and it is paid for by the fund. And
6 if later on we do find the PRPs, we go after them
7 for those costs in terms of those that occurred
8 during the remedial investigation and feasibility
9 study.

10 The remedial investigation,
11 basically you just look at a site and, in
12 essence, the contamination. It is kind of the
13 next step after the science inspection. We will
14 kind of get a better idea of what is going on and
15 we begin establishing criteria for cleaning up
16 the site.

17 The feasibility study is
18 simply a way to identify the best technical
19 alternatives to clean up the site, to meet those
20 criteria, and then we do a detailed analysis of
21 the costs and the techniques of those
22 alternatives.

23 After we get to that part, we
24 issue a proposed plan, which, like Pat said, all
25 of you, hopefully, picked up outside and we have

PUBLIC MEETING

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2 a 30-day comment period.

3 The point is to make all the
4 information available, not only what our
5 alternative is, but other alternatives we've
6 looked at and all the background, which is
7 available at the local library right now.

8 We allow the community about
9 30 days to comment, and then all those comments
10 will be addressed in the final record of
11 decision, which lays out this is what the EPA
12 says has to be done, this is what it is going to
13 be doing, and it is based on all the work we have
14 done and, also, the comments we received from the
15 public.

16 After that, we move into
17 design, which is more the technical energy
18 phase. We say here is what we think should be
19 done. Then we have to have a technical design.

20 Usually, if it is a pier
21 site, they submit it to us and make sure it is
22 appropriate and then we move on to remedial
23 action, which is actually building the pump and
24 treatment plant.

25 Day construction begins until

PUBLIC MEETING

1
2 the day construction is finished. That's the
3 remedial action of that.

4 When construction is
5 finished, we consider the remedial action done,
6 although we are still cleaning up the site and we
7 go into operation and maintenance where we
8 monitor the remediation and monitor and make sure
9 the site is cleaned up or being cleaned up as we
10 said, it should be in the written document.

11 That's basically was it is.
12 The Superfund itself I'm going to talk a little
13 bit about the specific site and what I know about
14 the site, although we do have Sal here, who used
15 to work for the EPA and he's the one that got the
16 site on the Superfund.

17 In 1941, it was purchased by
18 someone named Patrick Marone, who later sold it
19 to Inmar Associates, or a predecessor of Inmar
20 Associates, and they were using it for solvent
21 and refining recovery.

22 In 1970, SCP leased the site
23 from Inmar Associates for processing industrial
24 waste and the site was closed in 1980 by court
25 order. Do you remember why? I couldn't find out

PUBLIC MEETING

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why.

MR. BADALAMENTI: I don't
remember why.

MR. GORIN: It was
interesting to me.

Then in 1983, Sal placed the
site on the Superfund list, and later in 1985 the
EPA issued letters to 141 potential responsible
parties.

This site has a lot of
responsible parties, and we offered them the
opportunity to do remediation of the Superfund
site agreement. 108 consented to do it and 31
said no, and the EPA issued a unilateral order to
work with the 108 to do it.

Then, in 1985, EPA ordered
Inmar Associates to remove some tanks that were
remaining on the sites, and I think he got rid of
most of those tanks in 1986 shortly after the
order, and then the last one had a lot of PCP
contamination.

We really had no place to
send that until about 1998, and as soon as we
found a facility that would take that, we shipped

PUBLIC MEETING

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it off. So that's in 1999.

In 1987, the PRPs began the remedial investigation of the oversite where they looked at, like I said, the site itself.

The contamination--we found the site had a lot of contamination and a lot of rubble and a lot of sludge, and it was basically an extremely complex site with a lot of problems that we are going to have to deal with to figure out how to clean it up and then something strange happened here. I'm not sure of all the details.

In 1990, the remedial investigation was issued. Usually that comes first. I will talk about that first, even though it came after the feasibility study and that remedial investigation.

Like we said, we figured out the site is highly contaminated. It is not homogenous. There's a lot of rubble. There is some sludge areas and there is also some contamination under what we call clay layer area and a till area and that also leads down to the bedrock area. So there is contamination in aquifers below the clay slab on the site.

PUBLIC MEETING

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2 We had shallow groundwater
3 contaminated on the site itself and we had
4 rubble, soil and sludge contaminated on the site
5 itself. At that point we decided to break it
6 into two areas.

7 One would be everything above
8 clay area, which is 15 feet down, includes the
9 rubble site, sludge and the shallower
10 groundwater, which affects the water unit and the
11 deeper unit, we call the till area and the
12 bedrock area, as well as Beach Island Creek.

13 And now we are going to move
14 back to the feasibility study. During that time,
15 they looked at a whole bunch of ways to clean up
16 the site.

17 Like I said, it is a very
18 complex site. We identified some areas
19 potentially that had the ability to be either
20 removed or treated, but it was--technically, they
21 weren't really sure how to do it. But the EPA
22 felt this is the source. This is the source of
23 the contamination groundwater, the contamination
24 of the river and potentially continuing source of
25 contamination in the till area, so something had

PUBLIC MEETING

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2 to be done right away.

3 In 1990, the EPA issued the
4 interim order, which basically laid out some
5 things we knew we could do right away. The key
6 to this remedy was a containing wall, slurry wall
7 around the whole site, a bentonite slurry wall,
8 and inside is a piling that leans center and that
9 was dug down and repeated into the clay layer.

10 And there is also along the
11 creek we put a sheet pile wall to keep the soil
12 wall from collapsing and we covered the whole
13 thing with what we call the infiltration barrier,
14 which overlays all sides. If you've been to the
15 site, just basically a heavy duty thick plastic,
16 also sealed in a tracking system. I believe it
17 is five operating wells. And the idea is we are
18 going to pump water, about 1500 gallons a month,
19 and the idea was to keep that inside area nice
20 and dry so that way any water in, shallow
21 groundwater will be drawn into the site as
22 opposed to water in the site going out to the
23 outside area. So we want everything coming in to
24 try to prevent this from leaving the source.

25 We put wells around it and

PUBLIC MEETING

1
2 monitors to see if this would be effective in
3 preventing the spread of contamination. And the
4 construction of that was completed in 1992.

5 Since then we have done
6 little things. We removed the final tank. We
7 removed the building on-site. We have been doing
8 continued monitoring. We have been looking at
9 different options that we didn't really address
10 from the 1990 requirement.

11 I said, "What can we do here?
12 Can we treat?"

13 We came back to it wasn't a
14 real good way to treat the whole site, but there
15 were hot spot areas or certain sludge areas that
16 were homogeneous and highly contaminated that we
17 were able to treat.

18 We actually delineated one
19 area, which is probably one percent of the total
20 volume of the site, which had the most volatiles
21 and PCBs on the site and we came up with
22 different ideas how to treat that.

23 PCBs were proposed to that
24 and we sent it to our science division and they
25 realized I could aerate the sludge and basically

PUBLIC MEETING

1
2 seal it in cement.

3 The aeration removed the
4 volatiles and then by sealing it with cement it
5 prevents the PCBs from leaching out.

6 The EPA went to the site and
7 found some highly contaminated sludge, brought it
8 back to the lab and tried it in the lab and it
9 was very effective in the lab. We were happy
10 with the results in 2000.

11 One of the best alternatives
12 the EPA felt was to take the whole area, fix up
13 the containment, make it permanent--Steve will
14 explain how they propose to do that--and treat
15 that one sludge area to prevent that from being
16 the source, even though truly the contaminant for
17 the last 10 years hasn't prevented anything from
18 coming out.

19 We know we have this one
20 spot. We know we could do something. We should
21 treat and maybe contain it and everything left on
22 the site, we are leaving a lot of stuff, will be
23 prevented from spreading.

24 Steve will come up and go
25 through the alternatives a little more.

PUBLIC MEETING

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2 MR. FINN: Thank you very
3 much. What I'm going to do is just walk through
4 with the alternatives that EPA asked us to
5 evaluate and were written into what's called
6 actually a focused feasibility study.

7 If you look in the public
8 library, you will find that document there. That
9 evaluates what can be done in addition to what
10 had already been done back in 1990.

11 Remember John talked about
12 the construction of the slurry wall around the
13 site and the infiltration over the surfaces which
14 we worked on.

15 What can be done to turn this
16 into a permanent long term remedy for the site
17 rather than just the interim approach that had
18 been taken in 1990 to address what were the known
19 threats at that time.

20 So if you--this is in the
21 proposed plan. We had a copy of this already.
22 Basically, there were five different alternatives
23 that were examined and I'm going to talk about
24 four of them. Not a great deal in detail.

25 I will talk about No. 5,

PUBLIC MEETING

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2 which is what the EPA is proposing in rather more
3 detail. The first one is simply not to do
4 anything. You think that might be a strange
5 thing to include. But actually the law under
6 which we are operating requires that the EPA
7 examine what if we do nothing. What are the
8 risks to the human health and environment if we
9 don't do anything?

10 So that alternative was
11 looked at. I'm not actually going to say
12 anything about it, because the answer is to do
13 nothing really wasn't the best idea on this site.
14 There were some things that can be done to
15 improve the condition so, therefore, the EPA
16 believed it should be done.

17 The second alternative to
18 look at was to excavate the entire site. Could
19 we then take the soils--and John mentioned the
20 soil out there. There is a sludge out there.
21 There's a lot of debris. Some of it is extremely
22 large. The concrete blocks the size of pickup
23 trucks, and so on, could we actually remove all
24 of this and take it away and treat it somewhere.
25 That was number two.

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The third one was looked at.

As John said, we did identify there was one particular road of the site which actually the reason for this area being what it is is back in the day when it was operated for recycling insolvents and so on, they had a lagoon, actually two lagoons, that were in this particular corner of the site where I guess everything that they didn't know what else to do with got put in there.

And so we ended up with this nasty soup of sludge in that area, which is what we refer to as a hot spot, not because it is warm in temperature but because the contamination is extremely high in that area, much higher than it is anywhere else.

One thing was to say, "Can we remove that area?" And that material is so contaminated it would have to be insulated and taken off site and incinerated.

In addition to that, we would make the, instead of the plastic that you see across the site right now, which was a temporary measure back in 1990, we'd actually put a proper

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2 cap on the site, something that would enable the
3 site to be used in some beneficial way in the
4 future. So that was part of this alternative.

5 In addition, we wanted to be
6 able to restore the stream bank. If you've been
7 out there, John referred to the sheet pile wall
8 that was constructed along the riverbank.

9 The reason that was put in
10 there in order to create a work platform to
11 construct a slurry wall. It is the only reason
12 it was put there. It is actually not needed long
13 term permanently but it was needed in order to
14 construct the slurry wall.

15 We want to restore the stream
16 bank giving it the more natural appearance for
17 the environment so it will look a lot nicer.
18 That will be part of this alternative, and to
19 continue to collect and treat the shallow
20 groundwater.

21 John mentioned that has been
22 underway since 1990 already. That needs to
23 continue to occur for as long as there is
24 contaminate groundwater on the site. So that was
25 number three.

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2 Number four was to say, okay,
3 rather than dig up this hot spot area, this
4 sludge area, can we treat it where it is?

5 And, in fact, four and five
6 have that in common. They both involve treating
7 the sludge where it is, on--in situ is the phrase
8 you will read in the proposed plan, and there are
9 two different ways of doing this.

10 First was to use the
11 technology called thermal desorption, and I will
12 talk a little more about what that is. And
13 alternative five is using a different approach,
14 and this is the one the EPA is proposing as the
15 alternative, which is to use a two-step process.

16 One using air to remove the
17 volatile, to evaporate off the contamination that
18 will evaporate and you use solidification and
19 stabilization to deal with the contaminants that
20 are not natural and not evaporative and aerate
21 the spot.

22 Both four and five include
23 the same elements of number three in it, capping
24 the site so it could be reused, restoring the
25 stream bank and using the collected treated

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groundwater.

So those are the common elements between alternatives three, four, and let's talk about each of those in a little more detail, and I'm just going to describe them.

And, in particular, rather than walk you through all of the evaluation, I'm just going to highlight the advantages and the disadvantages of each of these alternatives.

If you want to look at this and study it in more detail, the feasibility study in the public library goes through this. It is actually a whole series of criteria that have been established that you look at to compare different alternatives.

This is a very quick synopsis of this thing. The advantage of this number two was to excavate the entire site. Big advantage is that we would remove all the contaminated soil, all of the debris and sludge and so on. That's quite attractive in one sense.

The disadvantages, though, are that, number one, this would be extremely difficult to implement. You all know the site at

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2 least as well as I do. It is a confined site.
3 It is bounded by two busy streets, Paterson Plank
4 Road and Gotham Parkway on each side, Beach
5 Island Creek on the third site, and an operating
6 business on the fourth site. It is a very
7 confined site.

8 As I mentioned earlier,
9 within this periphery itself you have these
10 massive debris things the size of pickup trucks
11 that we discovered when the slurry wall was
12 built. So it would be very difficult to actually
13 excavate this entire site without being
14 extraordinarily disruptive to the whole
15 community.

16 In addition to that, because
17 of the high level of contamination, the whole
18 thing would have to be done inside an air
19 containment structure because if that was not
20 done, and, in fact, even if that was done, the
21 risk to the surrounding community associated with
22 the air emissions would be very substantial. So
23 it would be very difficult to do.

24 The risk of causing pollution
25 in the process of doing this was also significant

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2 as well, the potential for releasing
3 contamination to the creek. The potential of
4 releasing contamination, further contamination to
5 the deeper groundwater was substantial with this
6 alternative.

7 Also, as I just mentioned earlier,
8 associated with doing this large scale
9 excavation, is the large potential releases of
10 organic contamination which would be a high risk
11 to the surrounding community. Also having
12 excavated this material, it would have to be
13 transported off site.

14 Most of this material is so
15 contaminated there are only a couple facilities
16 that will take it. Both happen to be in Texas.

17 So we will be transporting
18 this material all the way to Texas and you,
19 obviously, have the risk of all communities
20 between here and there, the potential of spill
21 along the way, and last but not least, it would
22 be extremely expensive to implement this
23 alternative. It will estimate \$94 million.

24 That alternative was looked
25 at but for those reasons was felt not to be

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2 favorable. The biggest of those reasons really
3 being the difficulty associated with implementing
4 it. It would just not have worked the way
5 everybody would like.

6 The next alternative was to
7 look--I apologize, this does not project awfully
8 well--was to excavate the sludge material. This
9 is a cross-section, if you will, through the
10 site.

11 So you can see a number of
12 features is the creek itself. Here's the sheet
13 pile wall which you see. Here's the slurry wall,
14 which is structured inward of that.

15 As John said, that slurry
16 wall goes down to the clay slab which exists with
17 the till aquifer and here we have the sludge,
18 which it doesn't go all the way to ground
19 surface.

20 There's a couple of feet, or
21 something over it, in some areas, but then you
22 have this area of sludge. And all it would be is
23 to try to excavate that tile out.

24 To do this a couple of things
25 would be necessary. One, again, it would have to

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2 be done inside an enclosed structure because the
3 air emissions that would result from this kind of
4 excavation would be substantial.

5 We couldn't just let that
6 contamination drift off onto Gotham Parkway and
7 Paterson Plank Road, and so on and so forth. It
8 would have to be contained.

9 And, furthermore, we have to
10 construct a supported operation excavation in
11 order to excavate out this material and avoid the
12 potential for damaging the slurry wall, which is
13 what's protecting the creek. So that would be
14 how this alternative would be implemented.

15 Some of the advantages and
16 disadvantage of this will be on my next slide
17 here. So why don't I go to that, the advantages
18 of this.

19 First and foremost, the most
20 contaminated material, this sludge area, and it
21 is substantially more contaminated than any other
22 part of the site, would be removed. How do you
23 want to do that?

24 The disadvantages in this case, again,
25 difficulties of implementation. Not as

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2 difficult, obviously, as excavating the whole
3 site but still substantial.

4 Again, we would need this
5 containment structure to avoid air emission
6 problems. We would need to have operation
7 excavations to protect the integrity of the
8 slurry wall. The EPA is doing a very good job of
9 preventing contamination leaving the site.

10 We continue to have some
11 risks of pollution of the creek and of the
12 groundwater associated with doing this.

13 Just to add one point, this
14 clay layer that underlies the sludge in some
15 places it is as thin as about two feet. About
16 this much.

17 So one of the concerns with
18 this approach was this operator of this excavator
19 has got to be extremely careful that he doesn't
20 end up overdigging slightly and punch through
21 this clay slab, because if that happens, then you
22 get contamination released to the till aquifer,
23 which ultimately, not locally here, is an aquifer
24 used for water supply. So that was a concern to
25 us.

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2 So we have that potential for
3 release to the creek, potential for release of
4 contamination of groundwater as well.

5 We continue to have risks to
6 the community associated with air emissions. We
7 looked at that very carefully to see how that
8 would be controlled. There still will be
9 significant risks.

10 We would be transporting this
11 off site, but, nevertheless, this would be the
12 most contaminated material which would have to be
13 transported off site. The costs obviously are
14 less but still substantial, about \$17 million for
15 that alternative.

16 The other two alternatives we
17 looked at rather than try to remove this material
18 with all the attendant risks to the community
19 with doing that, all the attendant risks of
20 transporting it off site, can we actually treat
21 it? Deal with the contamination without taking
22 it off the site? Two alternatives were looked at
23 as the way to do that.

24 The first one was to treat it
25 by a technology that's called thermal

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2 them on-site using a thermal oxidizer, thermal
3 treatment system to destroy those vapors in
4 combination with the carbon absorption system.

5 So that was the approach that
6 was looked at as one of the ways to treat this
7 material on the site and remove the contamination
8 from it.

9 This is a fairly new and
10 innovative technology. It has not been done
11 extensively, but we did have extensive
12 discussions with the people that developed this
13 technology and have used it on the other sites
14 where it has been used around the country. Not
15 very many at this point but it has been used.

16 The conclusions as far as
17 advantages and disadvantages, summary here, first
18 of all, it does treat the most contaminated
19 material that we have on the site. That's good.

20 Obviously, by leaving the
21 material there, treating it where it is our risks
22 of polluting the creek and polluting deep
23 groundwater are avoided. The risks to the
24 surrounding communities are limited by that. It
25 also turns out to be less expensive as well.

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2 But the disadvantages to it
3 were a couple. One was, bluntly, uncertainties
4 as to whether or not it would actually work.

5 As I said, this has not been
6 done on very many occasions and very many sites
7 around the country at this point. As you all
8 know, this site is right next to the creek. The
9 sludge is very wet and that moisture content in
10 the sludge means that a lot of the heat energy
11 that you apply goes, first of all, to just
12 evaporating off the water, and it would take an
13 uncertain amount of time and certainly a lot of
14 energy to deal with that problem.

15 The other thing, and this was
16 what really the final nail in the coffin of this
17 alternative, was that there's a lot of oils and
18 what you call organic carbon grease, and so on,
19 in the sludge material. When you heat that up,
20 what you basically end up with producing is an
21 ash which would have clogged the wells.

22 Remember, you have these
23 heater wells and then you have to be able to
24 extract the contamination through those. When
25 you heat this material up, because of the oil and

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2 grease in it, it would seem highly likely that we
3 would have an ash form that would clog up the
4 wells and we would not be able to remove the
5 contamination.

6 So, in fact, with extensive
7 discussion, the vendor that actually does this
8 agrees that this was not a very good candidate
9 site for their technology.

10 Also, another risk that was a
11 bit of a concern with regard to if we were able
12 to make this work, draw off the vapors, one of
13 the by-products of the treatment would have been
14 hydrogen chloride because of the nature of the
15 contamination. That's difficult to treat and
16 could end up in air emissions which would not
17 have been good for the site. That was a lesser
18 concern, but it was something that we were
19 concerned about as well.

20 So that comes to the last
21 alternative that was evaluated, which is the one
22 that the EPA is preferring at this stage and
23 inviting comments on, which again is to treat the
24 sludge where it is on the site itself, but it
25 uses a two-stage process I've outlined here.

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2 The first one involves
3 injecting air into the sludge material, and I
4 will show you some diagrams of how this would
5 actually work. In essence, we are injecting air,
6 mixing the sludge and extracting contaminated
7 vapors. So rather than using heat to drive off
8 the organic contamination, now what we are doing
9 is we are using air to evaporate the
10 contamination off.

11 That avoids all the problems
12 of clogging with ash and so on. We are not going
13 to create that. We would in the same way collect
14 those vapors and be able to treat them on-site.
15 It would deal--in this case, it wouldn't drive
16 off the PCBs, okay. You need high temperatures
17 to do that. We would be here looking to drive
18 off all the other contamination.

19 Instead, to deal with the
20 PCBs, there would be stage two of this process
21 where we mix into it lime and cement, which
22 basically solidifies the sludge material and
23 encapsulates those PCBs and other contaminants
24 and prevents them from ever going anywhere in the
25 future. So that would be the second stage of the

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2 taken off to a treatment system on the site
3 itself. Because they are just organic vapors,
4 they are pretty straightforward to treat. A lot
5 of technology is available so we can deal with
6 those vapors.

7 So that's the first stage.

8 And this would be done, you treat this sort of
9 column of material and then the machine moves
10 over and treats one next to it and so on. And
11 you can run this machine for as long as you need
12 to run it to remove the organic contamination.

13 As John said, we did the
14 study in the laboratory. We did it on a small
15 scale in the laboratory, and we found, actually,
16 within a couple of hours of aerating the material
17 we had driven off just about all of the organic
18 contamination.

19 What we will do in the field,
20 if the EPA agrees to go forward with this
21 alternative, is that the vapors coming off would
22 be monitored until there aren't anymore until we
23 have them out of there. That's the first stage
24 that would be done throughout that area.

25 And the second stage uses the

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2 same piece of equipment, but now, instead of
3 using air down the center piece, you inject a
4 slurry that contains the lime and cement, and
5 again that's mixed into the sludge.

6 And, again, we did study this
7 in the laboratory to determine how much lime and
8 how much cement was the optimum amount to end up
9 creating effectively a block of concrete here
10 which prevents any of the remaining contaminants
11 in this area from ever leaving that area, from
12 ever being able to be leach out from the
13 material.

14 And, as John said, that study
15 was reused by EPA's development and research
16 folks, and they agreed it was a very promising
17 approach for this particular site.

18 So what are the advantages
19 and disadvantages of this approach? Some of the
20 same things as you've seen before.

21 Obviously, it treats the most
22 contaminated area. Again, because we are dealing
23 with it in place, the risk of polluting the creek
24 further or the groundwater are avoided.

25 The risk to the surrounding

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2 community is avoided as well because we don't
3 have the potential for air emissions in the same
4 way.

5 The other thing that was a
6 significant advantage here, we have proven the
7 effectiveness in the laboratory, and not only
8 that, these technologies have been used at a
9 significant number of other sites.

10 The closest one I think to
11 here is a site over in Elizabeth, where they use
12 very much the same technology, a site over in
13 Elizabeth within the controlled chemical patrol
14 which was done a number years ago successfully,
15 and the cost is about the same as the preceding
16 alternative, about \$7.5 million.

17 In addition to treating that
18 sludge area, remember there are a few other
19 things that are involved in this alternative, and
20 this is my final slide.

21 One item that should be on
22 this list and isn't on here is, of course, we
23 still have the circumferential wall all around
24 the site that contains contamination. That's an
25 integral part of the remedies performing

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2 extremely well, since it was put in in 1990, and
3 that remains there and that really should be on
4 this list.

5 But the other items would be
6 the final cap over the site that would allow the
7 site to be used for some commercial purposes in
8 the future and remains to be seen exactly what
9 they are, but it won't look like it does today,
10 to be able to be used for a parking lot or
11 commercial buildings or something like that.

12 In addition, there would be
13 restoration of the stream bank so that we have a
14 natural channel there without the sheet pile wall
15 that exists right now.

16 One ancillary benefit, by the
17 way, it would increase the flow capacity from
18 time to time. I know flooding is there. We
19 would be continuing with the traction and
20 treatment of shallow groundwater.

21 In order to allow future use
22 of the site, all of the structures that are
23 involved with removing that groundwater would be
24 placed below ground so that they don't interfere
25 with any future use of the site.

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And last, but by no means least, obviously, there would be continued monitoring of the site. As John pointed out, there is a network of wells around the site and the creek continues to be monitored on a very regular basis and would be in the future. So that's my summary.

Questions for John or any of us?

MS. SEPPI: Thank you, Steve.

If I could just remind you, Mayor, if you could say your name first before your comments so we make sure we get it for the record.

MAYOR ROSEMAN: William Roseman. The mike, it doesn't amplify. If you want to amplify, there's a mike behind you.

My question really is it appears as though the final proposal is apparently the most likely or the one that seems the most feasible at this point. But yet you talked a little bit about the on-site air being vacuumed out and cleaned on-site, and I would like to know a little more about what that

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2 process entails.

3 MR. FINN: I didn't say a
4 whole lot about that. I would be happy to.

5 There really was going to be
6 in that air that's being removed is what are
7 referred to volatile organic compounds.

8 There are at least two good
9 ways in which they can be treated on-site.

10 MAYOR ROSEMAN: Does that
11 mean PCBs?

12 MR. FINN: That does not mean
13 PCBs. PCBs are not volatile. They are all being
14 removed.

15 Certainly there are two very
16 straightforward ways in which those vapors, can be
17 treated on-site, and I don't think the EPA has
18 made a decision yet as to which one or possibly
19 even both we could use.

20 One is to use thermal
21 desorption, thermal treatment of this, which
22 destroys old vapors, reduces them to a compound,
23 like water, by thermally treating them.

24 The other way to do it is to
25 use what's referred to as carbon absorption so

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2 that the vapors and/or organics are absorbed onto
3 carbon, onto charcoal, if you will. Then that
4 carbon, that charcoal actually gets taken off
5 site to the vendor that provides it and they are
6 actually--what the vendor then does they remove
7 the organics from that and they thermally treat
8 them in their facility.

9 So those are the two primary
10 alternatives for how that would be done.

11 MAYOR ROSEMAN: When you say
12 organic substance, can you give me an example?

13 MR. FINN: The sort of thing
14 we are talking about would be things like, on
15 this site, would be things like
16 trichloroethylene, TCE. You might have heard
17 that referred to. A similar compound called PCE.

18 There is also present on this
19 site, we have got things like toluene and
20 xylene. We have got some--Mary, help me out. We
21 have some benzene, some of the things that show
22 up in gasoline and so on.

23 MAYOR ROSEMAN: Are any of
24 them suspected carcinogens?

25 MS. OLSEN: Some of them they

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2 fall into different categories based on their
3 toxicity related to the carcinogenicity.

4 MR. FINN: For example, that
5 list I have, there is benzene is a carcinogen.
6 There are some vinyl chlorides on the site, as
7 well as vinyl chloride carcinogens.

8 MAYOR ROSEMAN: The reason I
9 ask, and I personally, as the governing body, I
10 don't think we have supported any one in
11 particular. We are here to learn, obviously.

12 But my question then is,
13 naturally the concern that we might have, and we
14 really need to be educated in that respect, is it
15 is scary to think that some of these are
16 suspected carcinogens and they are being
17 re-released in the air, and our concern is the
18 effectiveness in which the cleansing of that air
19 is.

20 MR. GORIN: That's a good
21 question. This is a question that always comes
22 up because we treat soils like this and we treat
23 water like this at a lot of sites, and, as Steve
24 pointed out, there are two ways we usually treat
25 it.

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2 We effectively burn it, and
3 the other way is to absorb it into carbon and
4 haul the carbon off.

5 That's actually a decision we
6 are not going to make at this time. We are going
7 to make it later in the design.

8 I think it is always a good
9 idea when you go to the design process to meet
10 with the public and say this is where we are
11 going. Whatever design we finally decide, we
12 would have to get all the permits by the statute,
13 this is how much you can release and how
14 protective it would be.

15 And after we are done with
16 that, we can say is this what we are going to do
17 and this is how we are going to monitor around
18 the perimeter of the site and this is how we can
19 prove to you you are not going to be affected by
20 the volatiles released from that.

21 As part of the design, we
22 will have ongoing meetings to discuss that sort
23 of thing. That was a good point and that was one
24 of the concerns with the other remedies.

25 Those are very difficult to

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2 control, the volatiles coming off the sludge
3 area. In this one it is easy. It is going to be
4 sucked up a hose and with the hose it is pretty
5 easy to do as opposed to what to do with it
6 inside a--what I'm trying to say, the answer is
7 this one we feel we can easily treat the
8 volatiles, and how we are going to do that, we
9 will probably come with a design and we will meet
10 with you, and if you are not happy with that--

11 MAYOR ROSEMAN: It is more a
12 matter of not knowing. My guess is that--I mean,
13 there is no system that's perfect, and my
14 assumption is that inherently some potential
15 carcinogens will probably escape. My guess is
16 you can't control that.

17 But then we would like to
18 know at what rate and what is the risk factor.

19 MR. GORIN: That's what we
20 will determine during the design. You are
21 right. You can't say zero release. You can't
22 say that when you are pumping gas there's no
23 benzene released.

24 What we can do is say what is
25 the risk? What we would consider is the risk and

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2 what would be something we are comfortable with.

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4 We are not going to put the

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community at significant risk, and that's what
Marian does.

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7 MS. OLSEN: What we can do is
calculate how frequently a person would be

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exposed, what the frequency of the exposure would

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be, the calculation of the associated risk, and

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then we could set a concentration that says it

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should not be above that, and for the whole

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design process it should be largely to make sure

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everybody is safe, and we've done that at other

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sites.

15

MS. O'CONNELL: We have two

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levels of protection. There is also concern for

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the workers while working right with it, so OSHA

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would apply to them for the protection. Those

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are always closely monitored as work sites.

20

And regardless of the

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determinations we have to make later with respect

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to how we treat the air, there is always

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perimeter monitoring, especially at a site like

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this where there's businesses and there are

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people in the community surrounding it. It is a

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populated area.

There will be significant monitoring and constant, I would expect, monitoring around the periphery of the site while work is ongoing. So there will be on-site protection for the workers and definitely it will get monitoring. And if any levels that are to be established were exceeded, the project would be shut down. That would be a priority.

MAYOR ROSEMAN: I don't mean to monopolize the questions, because the on-site protection I'm sure is such I've seen them working in their white suits and the masks. People see that and say, Oh, my God those people are in suits.

MS. O'CONNELL: I'm five feet away on the sidelines.

MAYOR ROSEMAN: My next question, and I thought maybe I should give somebody else a turn and I will ask my next question.

MS. SEPPI: Does anybody else have a question or a comment?

MR. CHARI: I looked at this

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2 report at this library in the transcript, and I
3 found that the recommendation of No. 5 process
4 with the SE 5, now this one I think it is
5 certain, first thing you got to use hot air.

6 MR. FINN: Not necessarily.

7 MR. CHARI: And the second
8 one is when you put hot air through a hose--the
9 hole in the ground, it is probably six inches
10 down, right?

11 MR. FINN: Okay.

12 MR. CHARI: What is the
13 damage to all of those?

14 MR. FINN: It might be
15 somewhere in the region of four feet, something
16 like that.

17 MR. CHARI: When you have
18 channeling of the air, you will not be able to
19 have uniform distribution because--so, of course,
20 you will say that this can be contracted by
21 increasing the time.

22 So this way approximately it
23 will become completely motivated, but I think my
24 question is the next thing comes in terms of
25 costs.

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2 In your report here you say
3 on page 12, on first paragraph, "We, the EPA,
4 believes hot spot treatment as described in SE 5
5 will be effective as a remedial action, if
6 appropriate, for standards for treatment
7 solidification and if containment are not met,
8 then remove the hot spot as described in SE 3,
9 will be performed."

10 So, to that extent, the fault
11 point is either SE 5 works for the
12 seven-and-a-half million dollars or the
13 seven-and-a-half million dollars in SE 3, which
14 is \$16.7 million.

15 When I look at all these
16 things, you are overly optimistic to think that
17 SE 5 will work and I believe SE 3 will be the
18 process to be using.

19 In fact, I'm going to write a
20 letter to you. It will be coming from me. I'm
21 telling you SE 5 should not be used for these
22 reasons.

23 And also another important
24 part, you will notice in Burlington there is an
25 information latex site and now it has gone on for

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2 about 20 years. I live in Rutherford, so I know
3 a little bit about this.

4 I don't work in this part of
5 New Jersey. I work somewhere else, in New
6 Brunswick side, and then you found Burlington
7 property, 10 acre of land now they say it is
8 worth about \$43 million. So that comes to around
9 four million dollars per acre.

10 Now the property value and
11 property size here is six acres. So on that
12 basis, six times four is \$24 million.

13 So, to that extent, I would
14 say SE 3 is a bargain if you can get it for \$16.7
15 million and SE 3 has a number of advantages. And
16 I think SE 3 should be the next one in which EPA
17 should concentrate its efforts.

18 So that's way I look at his
19 report and I found, are we missing anything, and
20 I find yes. We will be missing a lot, and I
21 recommend SE 3.

22 MS. SEPPI: Your name?

23 MR. CHARI: My name is.

24 MR. CHARI: Chari. S-A-M,
25 last name C-H-A-R-I. I have my business here in

PUBLIC MEETING

1
2 Rutherford.

3 MS. SEPPI: Thank you very
4 much for your comment.

5 MR. LAHULLIER: Craig
6 Lahullier.

7 Going back to the SE 5 are
8 what kind of dimensions? What kind of area are
9 we looking at for that lagoon that we said is the
10 hot spot?

11 MR. GORIN: 4800.

12 MR. CHARI: 85 by 95.

13 MR. LAHULLIER: 85 by 95, and
14 you are talking an auger, or whatever, on this
15 machine that is only going to do a four-foot
16 diameter hole.

17 MR. GORIN: One diameter and
18 it is going to go--

19 MR. LAHULLIER: You are going
20 to keep moving this thing. You don't move it all
21 after the slurry of concrete would be put in, so
22 you would actually totally clean one hole.

23 You would inject the concrete
24 into the one hole, then you would move your
25 equipment right next to it and start another

PUBLIC MEETING

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hole. Is that how it works?

MR. FINN: Let me just clarify.

It is a two-stage process, the first stage of which is to remove the organic contamination. That will be done everywhere to start with.

And part of the answer to this gentleman's question is that we would do the work in one location. You can then move over. You don't have to move over four feet. You can move over two feet and go down and at the end you get overlapping, and, in fact, that's what would be done.

It would be done in an overlapping grid pattern and you would go over the entire area to remove the organic contamination first.

That would be stage one. You do that, the entire area so you will be sure you dealt with that.

Then you go over the entire area on the second pass and produce the vapors.

MR. LAHULLIER: This is the

PUBLIC MEETING

1
2 normal procedure. This has been done all over
3 the place already.

4 MS. FONTANA: Once you pull
5 out of the first and second hole, isn't it now
6 exposed so those chemicals or whatever it is that
7 you are going to encapsulate are now free to the
8 air?

9 And is any of this--I notice
10 one of these things that required a full canopy
11 and then I think one of them would be the more
12 localized canopy.

13 Can that be something that
14 can be used over this hot spot?

15 MR. FINN: The important
16 thing, we've got a couple of different sorts of
17 contaminants presently. We got volatile
18 contaminants, which we must keep controlled,
19 okay, and that's the focus of stage one of this,
20 to deal with the volatile contaminants.

21 And you won't move from one
22 location to the next location until your
23 monitoring showed that all of the volatiles that
24 are going to come out of the ground there are out
25 of the ground. So then you could safely move

PUBLIC MEETING

1
2 without the risk of further release.

3 Now, the other contaminants
4 would remain and need to be treated with the lime
5 and cement, primarily PCBs, and they are not
6 volatile. So they would not stay.

7 MR. LAHULLIER: To someone`
8 that probably hasn't seen this process get done,
9 you are saying you could move two feet, not a
10 whole four feet or whatever, but if I have a
11 four-foot hole and I got this mixer in there
12 doing whatever, blowing air in and getting all
13 the volatile organics out and I move two feet
14 over and I start mixing, now I'm mixing two feet
15 of the hole I just did but now I have a six-foot
16 hole?

17 MR. FINN: You don't have a
18 hole. You are not actually removing any
19 material, okay. Think of it more in terms of a
20 food mixer in a bowl, a cake or whatever. You
21 are not removing the dough. You are mixing the
22 dough. We are not removing the sludge. We are
23 mixing the sludge in place without removing it so
24 you don't have a hole.

25 I'm sorry. If--

PUBLIC MEETING

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MR. LAHULLIER: It just seems

3

hard to fathom how that can clean that well

4

by--you are still blending two feet of your hole

5

that you just had nice and clean and you move

6

over two feet, it seems like you are still

7

blending now the dirty material with two feet of

8

clean material.

9

And it just seems hard how

10

you can actually get that cleaner while also

11

having a vacuum cap over the area you are doing

12

trying to pull up all this stuff that is

13

percolating up through the soil.

14

It just seems awfully hard to

15

fathom how it can work that well. It really

16

does.

17

MR. FINN: It really does

18

work. It is done by specialist firms that do

19

this stuff. We have done it a lot of times

20

before.

21

The actual distance is how

22

far you move and so on. So, a combination of

23

things.

24

One, you obviously, if you

25

really have completely cleaned an air, you

PUBLIC MEETING

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2 don't--

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MR. LAHULLIER: Recontaminate
it.

5

6

7

MR. FINN: --recontaminate
it. At the same time this gentleman here was
saying you are injecting air in the middle.

8

9

10

Have you cleaned all the way
to the edges of the four feet the same as you
have right in the middle? Maybe not.

11

12

13

So, therefore, you would want
to overlap a little bit. So you can see there is
a little give and take.

14

15

16

17

18

MR. LAHULLIER: Just while
this process is going on, say you get half done,
or whatever, and we have a flood condition
because we are talking of a flood area down there
where the groundwater comes up, washes all this.

19

20

21

22

23

Now, is the wall that's
around this area that tight that--what happens
with the water that falls inside the contained
area, that would go in and rerinse all the clean
work with dirt again?

24

25

MR. FINN: We have right now
a bib by the site. If you look through the

PUBLIC MEETING

1
2 fence, you will see that we have the black
3 plastic cap over that.

4 The purpose of that is to
5 stop rain water from infiltrating into this
6 area. The slurry wall does work very well.

7 The water levels inside the
8 site are lower than outside and we have
9 monitoring locations inside and outside to check
10 the containment. So the idea that John
11 mentioned, you get flow into the system and not
12 flow out.

13 MR. BADALAMENTI: Sal
14 Badalamenti. I'm interested in the basis of the
15 seven-and-a-half million dollar cost estimate.

16 I assume that includes the
17 process of aerating it and treating it?

18 That's not the operation and
19 maintenance part, correct?

20 MR. FINN: There are some
21 ongoing operations of maintenance costs
22 associated with continuing to monitor the site
23 afterwards.

24 The predominance of that cost
25 is up-front capital costs associated with the

PUBLIC MEETING

1
2 cleanup of the sludge and then contracting the
3 final cap over the area and the stream line.

4 MR. BADALAMENTI: What is the
5 duration you estimate for this process to take
6 for that cost to be established?

7 MS. O'CONNELL: Thirty years.

8 MR. FINN: I imagine the
9 construction period, as far as implementing this
10 remedy as the proposed plan says one year. That
11 essentially means one construction season it
12 could be done in. I don't wouldn't think it
13 would be any problems at all completing one
14 construction season.

15 The annual monitoring costs
16 are projected out here for a period of 30 years.
17 That's simply a standard number the EPA always
18 uses.

19 The monitoring would continue
20 for as long as it was needed. Just for
21 calculation purposes, 30 years is all that's
22 used.

23 MS. O'CONNELL: That's our
24 general formula.

25 MR. BADALAMENTI: Is this the

PUBLIC MEETING

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responsible party paid for the site?

MS. O'CONNELL: Yes, it is.

MAYOR ROSEMAN: I did have a question regarding yours.

The responsible parties who are being held responsible for payment, what consideration does the EPA give to the ability of the responsible parties being able to pay in their decision?

I mean, I will give you an example. If they found they could only get 20 million from the responsible parties, did that have any basis on their decision which to choose to clean the property?

MR. GORIN: That's a fair question.

Cost is a factor. There are like nine criteria when we decide a site. Cost is a factor and for some sites the ability of the PRP to pay.

If a town owned a landfill, we don't want to send a tenant to bankruptcy to clean up a landfill if there was a cheaper way to do it.

PUBLIC MEETING

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2 As far as a particular site,
3 we settled out de minimis for about--what is it?
4 60 PRPs. So I believe we have--is that right? I
5 believe we have about 80 PRPs left, names such as
6 Exxon and Mobil.

7 As far as costs, as far as
8 ability to pay for these particular PRPs, that is
9 not an issue if that's what you are asking.

10 MAYOR ROSEMAN: I wasn't
11 asking whether or not they would be able to bear
12 the costs.

13 I'm saying I don't know how
14 the evaluation process is done.

15 My question really is, in
16 their evaluation of the responsible parties, if
17 they found that they could raise, in other words,
18 if they found the responsible parties had the
19 ability to pay \$100 million, would you have made
20 a different decision as to which was the most
21 effective way to clean it?

22 MR. GORIN: These responsible
23 parties, if it was an actual site that cost \$100
24 million, with these responsible parties, I don't
25 think we would have an issue saying they can

PUBLIC MEETING

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afford \$100 million.

MS. FONTANA: Would you still
do SE-5?

MS. O'CONNELL: What drove
this remedy, the responsible parties of this site
collectively don't have an ability to pay issue
for any remedy we select, for the reason they are
very large companies. Cost is a factor.

We consider nine criteria
that we go through. This is what you see. We
weigh everything out. We review the cost from a
cost benefit point of view.

Our primary cost factor is
protectiveness. If a remedy isn't protective, it
is not going to be considered.

If four remedies are
protective, we move on and look at community
concerns, state concerns, long-term risks,
short-term risks.

There are nine criteria.
Cost is a criteria. So, everything else being
equal, with two remedies, if one is more cost
effective, that would weigh in at that point. It
doesn't drive the decision but it is one factor

PUBLIC MEETING

1
2 that we need to look at along with everything
3 else and we go through this.

4 MR. GORIN: I think your
5 hypothetical situation though, suppose you have a
6 PRP and a hundred million dollar remedy is the
7 most effective and they didn't have the ability
8 to pay, that's a good question for this
9 particular site.

10 If the \$100 million remedy
11 made the most sense to the EPA and it was the one
12 to go with, we wouldn't think it was an issue for
13 the PRPs to pay. There's deep pockets.

14 MS. O'CONNELL: We have other
15 sites where there are responsible parties who
16 have no ability to pay and that's where the
17 federal fund comes in, and if we need to tap into
18 that, that's what we do.

19 MAYOR ROSEMAN: I wanted to
20 make sure that the EPA wasn't thinking we would
21 love to do this, but we just don't have enough
22 money to do that.

23 MR. GORIN: If you want to,
24 you can call me tomorrow. I could provide you a
25 list of the PCPs.

PUBLIC MEETING

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MAYOR ROSEMAN: Your word is

good enough. I was afraid that like maybe the

first plan would have been the best plan, but the

EPA evaluated it and said, although that's the

best plan, you know, we could only put up \$16

million, so let's try the fifth plan. But that's

not the case.

MS. O'CONNELL: No.

MAYOR ROSEMAN: I just wanted

to know we were getting the best plan that's best

for the community as opposed to the cost

feasibility of it.

MR. GORIN: Any more?

MR. BADALAMENTI: In view of

this area potentially being the next future

Disneyland, how can we build foundations or

commercial property over a slurry wall without

destroying the integrity of the whole area?

MR. FINN: Let me respond to

that.

The slurry wall is about this

thick. So, in terms of building a structure, as

long as you don't build it right there, and the

slurry wall goes right around the boundary of the

PUBLIC MEETING

1
2 site, for some other reason you couldn't build
3 that close to the edge anyway, the slurry wall is
4 not going to be a major factor.

5 The other thing that might
6 influence you is that we are going to have to for
7 sometime continue to remove shallow groundwater
8 from the site so we have a series of wells on the
9 site.

10 I did mention in passing that
11 all the piping associated with that replacement
12 is below grade.

13 What I didn't mention is that
14 the locations of those wells and of the piping
15 is, again, going to be focused around the
16 perimeter of the site, which wouldn't be
17 developable anyway, in order to maximize the
18 opportunity for the future use of the site.

19 I can say we are trying to
20 think future use all the time, but we don't know
21 exactly what it is going to be.

22 MS. O'CONNELL: You also need
23 to understand the containment remedy needs to be
24 maintained for the long term in order for this
25 remedy to remain protective. It is a containment

PUBLIC MEETING

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2 just completely encapsulate it?

3

4 about the creek?

5

6 MAYOR ROSEMAN: Not the
creek. I was just using that as an example.

7

8 That they decided not to fool with it or disturb
9 it, so to speak, because in disturbing it they
10 would be releasing the mercury into the water and
creating additional problems.

11

12 My question really is why
13 aren't you? I'm not suggesting it. I would just
14 like to know why. Why you just don't put a
four-foot cap of concrete around the whole thing?

15

16 MR. GORIN: Without treating
the hot spot?

17

MAYOR ROSEMAN: Yes.

18

19 MR. GORIN: Why are we
20 treating the hot spot as opposed to the mercury?
That's a good question. That's one that I
21 thought.

22

23 I think the main issue, or
24 the main issue, we know and we feel and we have
experienced treating, as Steve explained, the hot
25 spot like this effectively and safely, and so we

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are confident we can do it.

And, number two, it is highly contaminated. As Marian has pointed out, it is one of the most contaminated spots that we have seen and I think there is a feeling this is an area we know we can easily treat.

It is homogenous. It is something that is doable. It is going to cost some money. That's fine. We can treat it and make it safer.

If something does happen, which we don't expect it will, we can do it. Let's do it. That's one area that has most of the contamination.

Fortunately, it is something everyone--one area we feel we can. So after that it is most likely described.

MS. MAHABIR: Karen Mahabir from The Record.

Does it get more nasty as time goes on?

MR. GORIN: With what?

MS. MAHABIR: Does it get more toxic and gross the longer it stays under

PUBLIC MEETING

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2 there?

3

4 that's under there?

5

MS. MAHABIR: Yes.

6

7 probably answer this better.

8

9 Some break down to less toxic
10 chemicals. Some become more like vinyl
11 chloride. It depends on the chemicals.

12

13 MS. MAHABIR: This method is
14 relatively new, this going into the ground and
15 pushing the air in and all that.

16

17 Is there any completed
18 examples anywhere? Have there been any recurring
19 problems? Is there anything that's liked popped
20 up after it's all been finished that we might
21 want to know about?

22

23 MR. FINN: The technologies
24 that are involved here have been around certainly
25 since the 1970s. So, in various forms, this has
26 been going on for quite sometime in terms of
27 other Superfund sites.

28

29 I think there's somewhere
30 like 20 maybe around the country where this has

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PUBLIC MEETING

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been done.

I think I did mention in passing the nearest site to it would be the site in Elizabeth. I'm not sure, but I haven't researched all 20 sites, but I'm not aware of any where there have been long term problems.

That was certainly a question that was raised by the EPA, and we looked into that in order to establish that we didn't anticipate that.

MR. GORIN: We actually found one issue in certain sites that had high volatiles like this. The volatiles weren't treated enough to high level.

Like Steve described, we are going to treat and move cement. If you don't treat, it doesn't solidify, so there are issues with that.

We are going to make sure we get it down and we have been working with the EPA's science department to get it down to a level we are confident it will solidify.

I think she said below one percent. There is no reason to believe that we

PUBLIC MEETING

1
2 can't get below one percent.

3 MS. MAHABIR: There is just
4 this one area, one lagoon?

5 MR. GORIN: This one lagoon.
6 The whole site.

7 MS. MAHABIR: This particular
8 one area, that is gross.

9 MR. FINN: We looked back
10 historically at the aerial photography of the--as
11 John said, this site started in the '40s. We
12 have aerial photographs for a long period of
13 time.

14 There are actually two
15 lagoons which were right next to each other so
16 they ended up at one messy spot, but technically
17 one lagoon.

18 MS. MAHABIR: How deep into
19 the ground?

20 MR. FINN: Fifteen feet.

21 MS. MAHABIR: Pretty close.

22 MR. GORIN: That's from the
23 surface down.

24 MR. BADALAMENTI: You
25 mentioned the glacial till area is an aquifer.

PUBLIC MEETING

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Where is the closest
downgrading drinking water, portable water well?

MR. FINN: You are taxing my
memory slightly.

We did a well search of the
New Jersey Department of Environmental
Protection. They maintain records, as I'm sure
you know being a former EPA guy, of all the
ground wells that exist, so a well search was
done.

I don't think there is
anything within, certainly not within a half mile
of the site, maybe within a mile of the site, and
there is--you have a number of monitoring wells
within the till aquifer around the boundary of
the site.

None of those would indicate
the contamination spread anything like that far.
So there are no water wells that are known to be
any risk at this point.

MS. O'CONNELL: We would like
to thank everyone for taking the time to come out
and contribute.

As Pat said in the beginning,

PUBLIC MEETING

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2 our public comment period closes on the 15th. If
3 you or anybody you know has any questions,
4 comments, John Gorin's telephone number is here.

5 Our address is in the back on
6 the last page in the box on the proposed plan.
7 Please feel free to call or send comments in
8 writing through the 15th.

9 If anybody that you know of
10 is interested in discussing anything with us,
11 please contact us through that date and we will
12 be happy to speak to them.

13 (Time noted: 8:20 p.m.)
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C E R T I F I C A T E

I, MICHAEL WILLIAMS, a Certified Shorthand Reporter and Notary Public of the State of New Jersey do hereby certify that the foregoing is a true and accurate transcript of the within proceedings, to the best of my ability.

Michael Williams

MICHAEL WILLIAMS, CSR

License No. XI01991

Notary Public of the

State of New Jersey

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ATTACHMENT D
WRITTEN COMMENTS

Golder Associates Inc.

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September 27, 2001

Project No.: 943-6222

Mr. Jon Gorin
U.S. Environmental Protection Agency
29 Broadway, 19th Floor
New York, NY 1007-1986

RE: SCIENTIFIC CHEMICAL PROCESSING SITE, CARLSTADT, NJ
PROPOSED PLAN

Dear Mr. Gorin:

Thank you for the opportunity to comment on the EPA Proposed Plan for the Scientific Chemical Processing Site. On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), this letter requests clarification of certain statements within the Proposed Plan for the above site released in August, 2001 by EPA for public comment.

On page 10 of the Proposed Plan EPA correctly notes that there are no chemical-specific applicable or relevant and appropriate requirements (ARARs) for the contaminated soils. Reference is nonetheless made to the New Jersey Soil Clean-up Criteria (NJSCC) in the context of Alternative SC-2. EPA notes that the NJSCC are To Be Considered (TBC) criteria. We would like clarification, for the record, that the NJSCC are not ARAR and will not be used to set clean-up standards, particularly for EPA's Preferred Alternative, SC-3.

EPA also notes on page 10 of the Proposed Plan that all of the alternatives must comply with the New Jersey Technical Requirements for Site Remediation, N.J.A.C. 7:26E *et. seq.*, the New Jersey Brownfield and Contaminated Site Remediation Act, N.J.A.C. 58:10B and any relevant local requirements. We would appreciate EPA's clarification that, in accordance with CERCLA and the National Contingency Plan, compliance is only required with the substantive requirements of promulgated state requirements that are applicable or relevant and appropriate (ARAR) and more stringent than promulgated federal standards. Aspects of the cited regulations that are not ARAR, as well as non-substantive (e.g. administrative permitting requirements) are therefore not mandatory.

We appreciate the opportunity to comment upon the Proposed Plan and look forward to continuing to cooperate with EPA on the remediation of this challenging site.

Very truly yours.

GOLDER ASSOCIATES INC.,

A handwritten signature in cursive script, appearing to read 'P. Stephen Finn'.

For P. Stephen Finn, C. Eng.
Facility Coordinator

cc: Cooperating PRP Group

Sam Chari, Ph.D., P.E.
12 The Terrace
Rutherford, NJ. 07070
Tel: (201) 935-4731

September 12, 2001

Mr. Jonathan Gorin
Project Manager
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, NY 10007

Re: Superfund Program – Proposed Plan
Scientific Chemical Processing Superfund Site
Carlstadt, New Jersey
Written Comments on the Proposed Alternative

Dear Mr. Gorin:

As you may recollect, I attended the Public Meeting held by you at the Carlstadt Municipal Building, 500 Madison Street, Carlstadt, New Jersey, on August 23, 2001, in which you discussed the Proposed Plan.

At that meeting, I gave my oral comments on EPA's Proposed Plan and recommended that EPA should use Alternative SC-3, Excavation of Hot Spot Area/Capping, and Shallow Groundwater Collection should be used instead of the Alternative SC-5, Air Stripping, Solidification/Stabilization, Capping and Shallow Groundwater Collection recommended in your tentatively Proposed Plan. I also told you at the meeting that I would also send my Written Comments to you making this recommendation.

I have now examined and reviewed all the site related documents, which were provided by you at the William E. Dermody Free Public Library, 420 Hackensack Street, Carlstadt, New Jersey.

Based on this study, I strongly recommend that Alternative SC-3, Excavation of Hot Spot Area/Capping, and Shallow Groundwater Collection should be used because of the following reasons:

1. Disadvantages of Alternative SC-5, Air Stripping, Solidification/Stabilization, Capping and Shallow Groundwater Collection recommended in EPA's tentatively Proposed:

- 1.1 Lack of homogeneous nature of the soil will lead to insufficient Air Stripping, due to channeling of the air during Air Stripping,

and the contaminants will remain in the ground even though they will be partially immobilized during the subsequent stages of Solidification/Stabilization, Capping and Shallow Groundwater Collection.

- 1.2 There is no assurance that rocks and small and large stones, and metal objects and metal or plastic drums and debris will not be encountered in the "sludge area" which is approximately 4,000 square feet in areal extent and which has an average thickness of 10 feet and which has a sludge volume of about 1,480 cubic yards. Due to these problems mechanical breakdowns may be encountered in the operation of the Auger in the Air Stripping process.
- 1.3 The load carrying capacity of the "sludge area" will be very small and more problems of mechanical breakdowns may be encountered in the operation of the Auger and related equipment in the Air Stripping process.

2. Advantages of Alternative SC-3, Excavation of Hot Spot Area/Capping, and Groundwater Collection:

- 2.1 The primary advantage of Alternative SC-3 is that the "sludge area" soil will be excavated and removed from the site, and the area will be filled with clean fill, and capped and the groundwater will be also pumped and sent off-site. As mentioned in your report this Alternative, in combination with the existing slurry wall and natural clay layer, will also prevent the spread of contaminants to the surrounding areas of the site or to surface water, thereby preventing any direct exposure to contaminated water.
- 2.2 In your report and also during your presentation on August 23, 2001, you stated that implementation of SC-3 would entail significant challenges such as instability of the sludge area soils, risk of contaminant migration during construction activities, risk of escape of VOCs during the excavation, risk associated with transporting the sludge to the treatment and disposal facilities, and an Estimated Construction Timeframe of 13 Months for Alternative SC-3 instead of One Year for your Proposed Plan of Alternative SC-5. I have examined these problems once again, and in my opinion these are normal problems for all remediation projects and adequate precautions can be taken to prevent damage to the bottom "clay area", and that Alternative SC-3 can be completed within budget and within in time, and I therefore recommend this Alternative SC-3.

2.3 In your report and during your presentation on August 23, 2001, you stated that "while EPA believes the Hot Spot treatment described in Alternative SC-5 will be effective, as in any remedial action, if appropriate performance standards for treatment, solidification and containment are not met then removal of the Hot Spot, as described in Alternative SC-3, will be performed". As I stated in the Public Meeting on August 23, 2001, and as I have stated above in these Written Comments under Section 1.1, 1.2, and 1.3, Alternative SC-5 has many disadvantages, and this will probably lead to the adoption of Alternative SC-3 after the commencement of an initial remediation effort using Alternative SC-5, after considerable expense and considerable lapse of time and a number of problems. I therefore recommend that this situation should be averted from the very beginning, and this is one more reason why I recommend Alternative SC-3.

2.4 The Estimated Present Worth Cost using Alternative SC-3 is \$16.7 Million. I believe that, even though this expenditure may appear to be a little high compared to the Estimated Present Worth Cost of \$7.5 Million using Alternative SC-5, it is lower than the remediation cost for similar property in the Carlstadt, New Jersey, neighborhood. Thus the 10-acre Industrial Latex Corporation Superfund Site in Wallington, New Jersey, which is about 4 miles from the SCP Superfund Site in Carlstadt, New Jersey, costs according to Newspaper reports of last month \$43.0 Million. The Estimated Present Worth Cost using Alternative SC-3 is \$16.7 Million for 6-acre SCP Superfund Site in Carlstadt, New Jersey. In my opinion this Cost seems to be therefore reasonable, and I therefore recommend Alternative SC-3.

2.5 The Estimated Construction Timeframe using Alternative SC-3 is 13 months and is comparable to the Estimated Construction Timeframe of One Year using Alternative SC-5. In my opinion this Timeframe seems to be therefore reasonable, and I therefore recommend Alternative SC-3.

I therefore strongly recommend that Alternative SC-3, Excavation of Hot Spot Area/Capping, and Shallow Groundwater Collection should be used instead of the Alternative SC-5 proposed by you. Incidentally, if necessary, I can also work for EPA, since I live in Rutherford, New Jersey, which is close to Carlstadt, New Jersey, as well as to your office in New York City. If you have any questions, please write to me or call me.

I request you therefore to consider these Written Comments on the Proposed Alternative favorably, and once again recommend Alternative SC-3.

If I can be of any help, please write to me or call me.

Sincerely yours,

Sam Chari

Sam Chari, Ph.D., P.E.